Swiss Medicinal Flora: a Result of Knowledge Transmission over the Last Two Millennia

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ZUSAMMENFASSUNG

Die Anwendung von Arzneipflanzen spielt bis heute in den schul- und komplementärmedizinischen wie auch in den volksheilkundlichen Bereichen der medizinischen Landschaft der Schweiz eine wichtige Rolle. In der vorliegenden Arbeit wird die Arzneipflanzen Flora der Schweiz hinsichtlich botanischer Zusammensetzung und Nutzung im Verlaufe von 2000 Jahren schriftlicher Überlieferung untersucht und vor dem Hintergrund des Traditionsbegriffs diskutiert. Kontinuität und Veränderungen in der Arzneipflanzennutzung werden analysiert, um damit einen Beitrag zur aktuellen Diskussion über die sichere Anwendung von Arzneipflanzen aufgrund von langjähriger Erfahrung zu leisten.

Im ersten Teil der Dissertation wird die heute aktuelle Medizinalflora mit der lokal vorhandenen Flora verglichen und die Entwicklung der Artzusammensetzung anhand einer Auswahl von 24 historischen und zeitgenössischen Kräuterbüchern untersucht. Insgesamt 768 Arten (32%) der Gefässpflanzen der Schweizer Flora sind als Arzneipflanzen im Laufe der Geschichte dokumentiert worden. Die Anzahl ist seit der Antike gestiegen von 285 spp. auf 476 spp. in der Renaissnace und ist seit da ungefähr stabil geblieben (gegenwärtig 477 spp.). Allerdings sind 465 einst genutzte Arzneipflanzen nicht mehr zu finden in den aktuellen ethnobotanischen Studien und scheinen dem zu folge nicht mehr in Gebrauch zu sein. Total sind 104 spp. lückenlos über die 2000 Jahre hinweg dokumentiert.

Im zweiten Teil wird der aktuelle Heilpflanzengebrauch in der Deutschschweiz untersucht (verwendete Arten mit ihren Indikationen) und der Wissenstransfer über Kräuterbücher eruiert. In 61 Experteninterviews mit Kräuterkundigen wurden insgesamt 254 Medizinalpflanzen (218 Gattungen, 87 Familien) in 934 Anwendungsnennungen („use reports“) dokumentiert. Hauptsächlich werden Blätter und Blüten für die Behandlung von Hautproblemen, Atemwegserkrankungen, Beeinträchtigungen des Nervensystems sowie gastrointestinalen Beschwerden verwendet. Als Wissensquellen werden zeitgenössische und historische Kräuterbücher angegeben. Die Auswahl aktueller Arzneipflanzen umfasst v.a. gut bekannte Arten mit einem breiten Einsatzgebiet. Trotz unterschiedlicher medizinischer Konzepte der Kräuterkundigen gibt es eine grosse Übereinstimmung bei der Verwendung vieler Pflanzen.

Der dritte Teil der Arbeit untersucht die spezifischen Anwendungen, verwendeten Pflanzenteile und Zubereitungen derjenigen ca. 100 Pflanzen, die über alle Zeiträume hinweg medizinisch genutzt wurden. Wiederum auf der selben Auswahl an Kräuterbüchern basierend konnten folgende generelle Trends festgestellt werden: Stabilität in der Nutzung von 56 Pflanzen bei 129 spezifischen Anwendungen (12.6% aller dokumentierter Anwendungen); eine allgemeine Ausweitung der Anwendungskategorien im Laufe der Zeit; ausserdem eine gegenwärtig vermehrte systemische (gegenüber topischen) Anwendung von Arzneipflanzen v.a. bei Atemwegserkrankungen und gastrointestinalen Beschwerden.

Ursachen für diese teilweise dramatischen Veränderungen in der Zusammensetzung und dem spezifischen Gebrauch der Medizinalpflanzenflora liegen einerseits in der Veränderung der verfügbaren Flora durch die Entdeckung neuer Kontinente und die Verschiebung von Handelsbeziehungen, andererseits aber auch in der Veränderung von medizinischen Konzepten (Humoralpathologie vs. „evidence based medicine“) sowie in epidemiologischen Entwicklungen, gesetzlichen Rahmenbedingungen und ökonomischen Faktoren.

Unseren vielseitigen Einblick in die Nutzung der Schweizer Medizinalflora diskutieren wir schliesslich im Zusammenhang mit dem Traditionsbegriff. Dabei werden emische und etische Perspektiven aufgegriffen die zeigen, dass „sich in einer Tradition sehen“ für die Identität und das Selbstverständnis von Kräuterkundigen sehr wichtig ist. Gleichzeitig taucht der Begriff der traditionellen Nutzung im regulatorischen Kontext auf, wo die Pflanzennutzung über mehrere Generationen als Hinweis für die Sicherheit von Arzneipflanzen-Anwendungen beigezogen wird.

SUMMARY

The use of herbal medicine forms a popular part of primary health care in Switzerland and is found in biomedical practice, complementary and alternative medicine as well as self-medication. We here analyse the Swiss medicinal flora from a botanical perspective and give a diachronic overview of medicinal plant use over the last two millennia, based on written knowledge transmission. Continuity and change in use patterns are analysed with the aim to contribute data to the actual discussion on safety and effectiveness of traditionally used medicinal plants.

In the first part of the thesis we compare the Swiss medicinal flora with the available flora. Development over time is analysed with 24 historically and contemporarily relevant herbals. A total of 768 spp. (32%) of the vascular plants of the Swiss flora have been documented as medicinal plants over the last two millennia. Numbers increase until the monastic period (366 spp.) and the Renaissance (476) and remain relatively stable since then (modern and contemporary era: 477). But, 465 formerly documented species do not occur in recent ethnobotanical studies and thus seem not to be used any more. Overall, 104 species are documented through all time periods.

In the second part we are interested in the actual use of medicinal plants in the German speaking part of Switzerland. In 61 expert interviews a total of 254 medicinal plant species (218 genera and 87 families) were recorded with a total of 934 use reports. Predominantly leaves and flowers are used for the treatment of dermatological, respiratory, nervous, and gastrointestinal problems. Books ranging from recent to historical herbals form an important plant knowledge source. Medicinal plants are used for self-medication and professional health care and despite different underlying medicinal concepts and philosophies, herbalists largely agree on the most important medicinal plant species.

The third part of the study analyses changes and continuity of use categories, plant parts used and application form of the ca. 100 medicinal plant species and ethnotaxa continuously documented over the last two millennia. General trends are: continuity in use of 56 spp. for 129 specific applications (12.6% of all documented applications); a general extension of use categories; a general shift from topical use towards systemic use for gastrointestinal and respiratory disorders.

Drivers for shifts and changes can be found in changes of the available flora (discovery of new floras, new trade routes), evolution of medicinal concepts (e.g., humoralpathology vs. evidence based medicine), epidemiology, legal framework and economic developments.

We finally discuss our findings against the backdrop of “tradition” and “traditional use”. Two quite distinct aspects of tradition emerge. On the one side, from an emic persepective of herbalists, tradition and traditional use provides an important framework of identity. They see themselves in a specific tradition. On the other side, use of medicinal plants over several generations is interpreted as an indicator for safe use by regulatory authorities, and as such has an impact on marketing approval of herbal products. This exemplifies the versatility of the term tradition in the context of medicinal plant use. Its interpretation very much depends on the either emic or etic perspective as well as the particular purpose.

CHAPTER 1

GENERAL INTRODUCTION

Point of departure

‚How many medicinal plants do exist in Switzerland?'

Looking backwards to the very beginning of my journey through the medicinal landscape of Switzerland this ‚simple' question was the decisive one. It gave rise to all subsequent research questions on herbalists and their use of the local medicinal flora as well as on the continuity and change of medicinal plant use over time. It led us to current topics of ethnobotanical studies such as comparing a local medicinal flora with the available flora (e.g., Moerman et al., 1999; Weckerle et al., 2011) or the diachronic development of a medicinal flora in the context of socioeconomic and cultural factors (Heinrich et al., 2006[a]; Smith-Hall et al., 2012). Decisive for such processes are the ways of knowledge transmission in a diverse medicinal landscape (Totelin, 2009; De Vos, 2010, Leonti et al., 2010; Leonti, 2011; Touwaide & Appetiti, 2015;).

Medicinal plant use is popular in public and private health care in Switzerland (Wydler, 2003; Saller, 2009). In 2010, at the beginning of this study, numerous ethnobotanical studies existed for neighbouring countries of Switzerland (e.g., Leonti et al. 2006; Nietschke, 2008; Grasser et al., 2012; Vitaline et al., 2013; Schunko et al., 2015). But only four scientific documentations of local medicinal plant knowledge in different regions of Switzerland were available, i.e., Napf, Central Switzerland (Poncet, 2005), Chasseral, Jura (Broquet, 2006), Val d'anniviers, Valais (Brühschweiler, 2008) and Ticino (Poretti, 2011). In the meantime two additional ethnobotanical studies (Valais: Abbet et al., 2014 and Prättigau, Grisons: Wegmann, 2013) and three ethnoveterinary studies were published (Schmid et al., 2012; Klarer et al., 2013; Disler et al., 2014). However, a general overview of the today's situation of herbalists - experts on medicinal plants - in a legally highly regulated environment was missing. Also, a historical framework which would allow for a comparative analysis of the regional studies was lacking. This Ph.D. thesis aims at filling these gaps.

Factors shaping a medicinal flora

The available flora as main resource for a local medicinal flora is shaped by climatic and geological factors (Smith-Hall et al., 2012). Changes of the available flora for example through the introduction of new taxa due to the discovery of new continents and new trade routes, also have had a deep impact on local medicinal floras (Anagnostou, 2015; Van der Veen & Morales, 2015). But, the available flora is only one of the factors that shape medicinal plant use (Smith-Hall et al., 2012).

Another strong driver of plant use is the cultural context and the embedded medicinal concepts, which are inextricably linked with socio-economic and legal-political developments of a region. In Middle Europe, the written transmission of medicinal plant use roots in ancient herbals from the Greek and Roman era. Written medicine always existed along various forms of oral traditions which mutually influenced each other (Leonti et al., 2015; Touwaide & Appetiti, 2015). The prevailing medicinal concept until the 17th century was the doctrine of humoral pathology, based on the philosophical concept of a corresponding microcosm and macrocosm (Rothschuh, 1962; Porter 1997). Monastic medicine (since the 8th century) added Christian ethos of charity as a new concept to medicine in Middle Europe. Starting in the 16th century, the era of enlightenment caused a scientific revolution that began to displace ancient philosophy and authorities. Finally, this led to modern biomedicine with its demand for scientific evidence (safety and efficacy). Parallel and as a countermovement to the scientific revolution the health political movement of naturopathy arose in the late 18th century (Roth, 1991; Wolff, 2008). It laid out the ground for what we may subsume as complementary and alternative medicine today.

Shaped through all these influences different fields of the medicinal landscape evolved and changed over time and finally resulted in todays' Middle European medical pluralism (Glaser, 2006; Bruchhausen & Schott, 2008; Hoefert & Uehleke, 2009; Jenny & Sharma, 2009).

Definitions of terms and taxa

Diachronic studies over extended time periods require both, an accurate definition of the term medicinal plant and the taxa considered. Challenges with definitions of what a medicinal plant actually is, led to the concept of a food medicine continuum as introduced by Johns (1990) and Etkin (2006; see also Fig. 1.1). Recent historical studies show that in Antiquity the distinction between food and medicine was blurred (Totelin, 2015; Touwaide&Appetiti, 2015). The old saying 'Let food be thy medicine and medicine be thy food' summarizes one of the core concepts of ancient medicine. A great share of the ancient medicinal flora was also used in daily diet (Touwaide & Appetiti, 2015). The food medicinal plant continuum is also omnipresent in recent time when people gather wild food plants for their healthy side

effects (Nebel et al., 2006; Brühschweiler, 2008; Stuber&Bürgi, 2011; Abbet et al., 2014). While clear definitions are rather irrelevant for daily activities of people, they are all the more important in the regulatory pharmaceutical context, where products need to be categorized and defined unambiguously before they enter the market (Helmstädter&Staiger, 2012). However, that food can be medicine and medicine food is reflected in products labelled as food additives or neutraceuticals (Heinrich et al., 2006[b]).

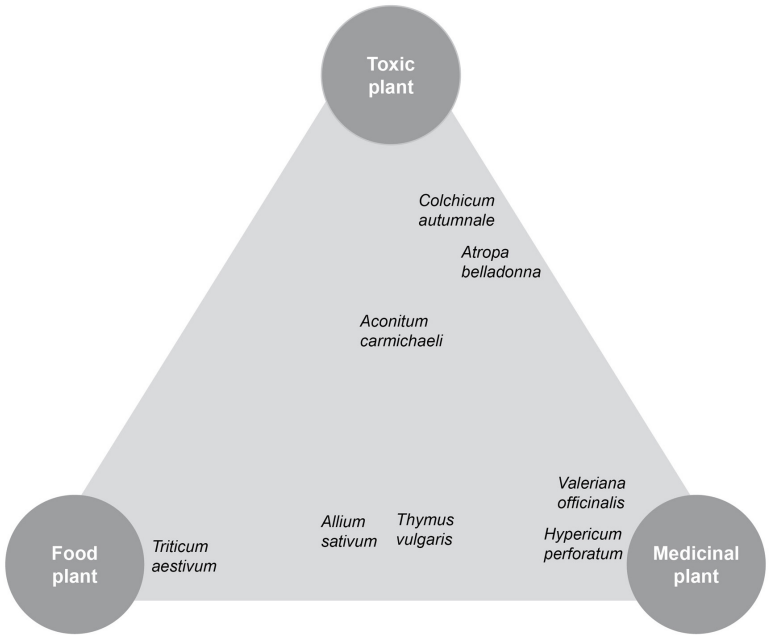

Fig. 1.1. Continuum between food, medicinal and toxic plants with examples.

The second issue that needs careful consideration are the so-called 'ethnotaxa', i.e., several plant species, genera or subspecies that are considered as a single taxon by herbalists or laypersons (e.g., folkbotanical classifications in the Napf region of Switzerland: Poncet et al., 2015; medicinal plant complex of 'Arnica': Obon et al., 2012). Therefore, when analysing written or oral information on medicinal plants, it has to be carefully verified to what entity the information refers to, e.g., species, varieties, genera, growth forms or any combinations. Again, for daily use of medicinal plants this question might not be important, but as soon as we want to analyse medicinal plant knowledge from a scientific perspecitive and compare it for example with the locally available flora we have to consider local classifications and may end up with different possible translations into scientific taxa (Berlin, 1992).

Traditional knowledge and intellectual property

Analysing a today's medicinal flora as a result of a selecting process from the available flora as well as knowledge transmission leads automatically to questions about tradition. Today's 'local knowledge' of

communities is often labelled 'traditional knowledge' implying that the medicinal plants are known and have been used since long time (e.g., Vitaline et al., 2013).

A more accurate definition of traditional knowledge (TK) for ethnobotanical studies is given by the WIPO[1]: '*the content or substance of knowledge resulting from intellectual activity in a traditional context, [including] the know-how, skills, innovations, practices and learning that form part of traditional knowledge systems, and knowledge embodying traditional lifestyles of indigenous and local communities, or contained in codified knowledge systems passed between generations*' (WIPO, 2010: p. 2). This definition was set up in recognition of intellectual property rights and contributions made by local or indigenous communities and has to be understood against the backdrop of the wish for equitable distribution of benefits obtained from genetic resources (Salick et al. 2003; McClatchey, 2009). Referring to this definition, local knowledge in a highly regulated environment such as Europe with a long history of written knowledge transfer cannot automatically been described as 'traditional' as the 'initial owner' of knowledge can hardly be identified. As shown in several studies on knowledge transfer in the Mediterranean–Middle European medicinal landscape, written text sources such as books and herbals as compilations of common knowledge can have a strong but not necessarily deliberate impact on local plant knowledge (Leonti, 2011; Lardos & Heinrich, 2013; Totelin, 2015; Touwaide & Appetiti, 2015). Such influence started more than two millennia ago with ancient medicinal texts, continued through monastic medicine and Renaissance and is still present today.

Tradition in a regulatory context

In the legislation of the European Union 'tradition / traditional use' of medicinal plants is defined as transmission over three generations, without explicitly defining the duration of a generation (EMA, 2015; Kroes, 2014). This definition refers to the primal sense of *traditum*, which is 'anything that is transmitted or handed down over at least three generations' (i.e. at least two transitions; Sihls, 1981: 12). In a regulatory context 'tradition' is a key criterion for registering herbal remedies without extensive scientific testing: ‚The medicinal product must have a history of at least 30 years of medical use, including at least 15 years of use in the European Community' (Helmstädter, 2012). In contrast to the above-mentioned WIPO definition where intellectual properties are crucial, here the main concern is safety and effectiveness of medicinal plants. The claim ‚traditional use' allows to register herbal

[1] **W**orld **I**ntelletual **P**roperty **O**rganization Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore. As the Convention on Biological Diversity (CBD) and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits do not provide a definition of the term "traditional knowledge", it is left to the parties to define it in their implementing measures.

remedies with long use history and apparent safety but without scientific evidence for efficacy (Kroes, 2014). However, traditions are dynamic because 'traditions, to survive, must be fitting to the circumstances in which they operate' (Helmstädter & Staiger, 2012:94, referring to Sihls, 1981). Thus, depending on the interpretation, the dynamic nature of traditions may hinder the registration of a medicinal plant, if for example the mode of preparation changed over the last 30 years in accordance with technical developments (Helmstädter & Staiger, 2012).

Tradition in pharmaceutical sciences

Pharmaceutical sciences seem to be quite aware of their history which finds expression in the distinct discipline history of pharmacy. Regarding written tradition of medicinal plant use, monastic and Renaissance herbals quote ancient authorities like Hippocrates (4th cent. BC), Dioscorides (1th cent. AD) or Galen (2th cent. AD) to emphasize a chain of tradition. Also, during the time of phytopharmacological experiments and studies in the late 19th century and at the beginning of the 20th century written heritage was still compiled in pharmacological textbooks (e.g. Hager's Handbook: Fischer & Hartwich, 1903; Tschirch, 1930). However, at that time the technical scientific development and the respective chemical insights were rated much higher than ancient medicinal plant knowledge which was declared obsolete.

In contrast, health political movement of naturopathy highly appreciated ancient authorities and continuity through tradition (Roth, 1991; Wolff, 2008). Books on folk medicine became available (e.g., Marzell, 1922; St. Galler Volksbotanik: Wartmann, 1874; Schaffhauser Volksbotanik: Kummer, 1953) that showed a new interest in 'tradition'.

Today, a re-evaluation of ancient herbals as source for drug discovery is broadly accepted and the main focus of historical ethnopharmacology (e.g. Riddle, 1999; Leonti et al., 2009; Adams et al., 2011; Anagnostou, 2011; Lardos, 2011; Heinrich, 2015). This field of research was recently even in the focus of mass media, when the Nobel Prize in Physiology or Medicine 2015 was awarded to Youyou Tu from China for her findings on artemisinin as a drug lead for malaria. Her research was based on the traditional use of *Artemisia annua* as documented in ancient herbals.

Tradition and identity

Using a medicinal plant in a 'traditional way' can generate a 'sense of filiation with earlier recipients of this tradition' and as such create a feeling of identity (Sihls, 1981:14). For example, in Swiss Alpine regions a kind of 'Swiss alpine medicinal herbs' tradition can be found, signifying the collection of wild

herbs with a special health benefit (e.g., Inauen&Irniger, 1995; Caminada, 2006; Stuber&Bürgi, 2011). This tradition started to emerge about two hundred years ago in parallel to a general romanticizing of the alps (Bätzing, 2005:13-24; Wydler, 2003). Mountainous regions were no longer perceived merely as dangerous and remote but rather as picturesque and healthy. Medicinal herbs from alpine regions were claimed to possess special medicinal power. At the same time, self-medication with medicinal herbs was still a necessity for health care in rural aeras. In this context also the two most popular herbalists of 20th century Switzerland, Johann Künzle (1857 - 1945) and Alfred Vogel (1902 - 1996), play a key role (Melzer et al., 2008; Condrau, 2009). They can be seen as a bridge between Renaissance authorities (e.g., the extremely popular herbal of Tabernaemontanus, 16th century, often referred to by Künzle) and the grandparents of today's generations. Another Swiss herbal was 'Unsere Heilpflanzen' from 1941, which was initially compiled by pharmacognosy professor Hans Flück (1901 – 1971) to support self-medication of rural people during World War II (Flück, 1941; Dal Cero, 2009). In 1932, he also founded the Swiss association for medicinal plants (Schweizerischer Heilpflanzenverband) to improve the cultivation of medicinal herbs (Roux, 2010). In 1945, the crop area for medicinal herbs covered ca. 43 hectares (Aeschlimann et al., 2015).

While 'Swiss medicinal herbs' from alpine regions were originally produced out of economic necessity, they still exist today but rather as trade mark for good, healthy quality. Furthermore, in today's Switzerland as in other European regions we find a revival of gathering wild tea and food plants, which is described by the people as learned within their family (Nietschke, 2008; Wegmann 2013; Schunko et al., 2015; Stryamets et al., 2015). This is done mainly for recreational rather than economic purposes.

All these factors contribute to the tradition of local medicinal plant cultivation, collection and use in Switzerland. Over the generations of recipients the *traditum* (i.e., anything that is transmitted or handed down from the past to the present) altered, but central aspects remained (Sihls, 1981:14). For the recipients, the sense of continuity and identity is crucial.

Tradition as adjective of medicinal systems and concepts

The term 'traditional' is also used for institutionalised health care systems of entire nations such as 'Traditional Chinese Medicine' (TCM). Since the Chinese political opening towards the west in the 1970s the concept of TCM was exported globally and therefore also arrived in Switzerland. In medicinal landscapes we typically find a coexistence of divers medical concepts into which new concepts can be integrated (Winkelmann, 2009; Giovannini et al., 2011; Monigatti et al., 2012). In Switzerland, TCM fast gained broad acceptance in the field of complementary and alternative therapies (CAM; Maxion-Bergemann et al., 2006). Consequently, a discussion on 'Traditional European Medicine' / 'Traditional

European Naturopathy' (TEM / TEN) emerged (Uehleke & Saller, 2011). Meanwhile, TEN practitioner is an established profession in the Swiss federal regulatory framework (Dakomed, 2015).
From an etic perspective TEM / TEN seems to congregated many different medicinal concepts and ideas. However, from an emic perspective it obviously creates identity for a specific group of practitioners, for whom a 'sense of filiation or of being connected' with an unbroken chain of generations sharing specific qualities emerges (Sihls, 1981:13).
Obviously, the term tradition is complex and is used in different contexts and for different purposes. A key aspect is the 'traditum' which is handed down from generation to generation. Depending on an emic or etic perspective, the aspect of 'being connected' or the aspect of continuity and change at a broader scale are paramount.

Outline of the thesis

The thesis focuses on the medicinal flora and knowledge transfer in Switzerland. As a country Switzerland covers Middle European and alpine flora and the medicinal landscape is embedded in a shared written heritage with neighbouring countries. Switzerland still has its own pharmaceutical legislation although aligned with the European Union. Regulation based on legislation and policies have a major impact on shifts and changes of medicinal plant use at a local level (Smith-Hall et al., 2012).
For a systematic diachronic overview we compile botanical and medical knowledge in a consistent database. In order to highlight different aspects of tradition we analyse the Swiss medical flora and its use from three different perspectives:

Chapter 2 focuses on experts of medicinal plants in today's Switzerland. The general question – What are „Herbalists" in today's Switzerland? – is answered by documenting and analysing medicinal plant knowledge of herbalists, knowledge transfer and knowledge change over time. Questions include "Which are the most often used / most important medicinal plants? Where did the herbalists get their plant knowledge from? How do they transfer their knowledge and skills to others? How did medicinal plant knowledge change over the last decades and centuries?

Chapter 3 characterizes the Swiss medical flora compared to the local flora. Shifts and changes over the last two millennia are shown. The analysis of textual evidence is based on 24 relevant herbals, starting from the prevailing written source of ancient medicine, Dioscorides' Materia Medica.

In Chapter 4 we analyse and discuss the ca. 100 medicinal plants used throughout the two millennia. We are interested in continuity and change of specific uses according to relevant herbals and discuss the findings in the context of medicinal plant use today.

Finally, in Chapter 5 we present two articles written in German for public outreach. As our ethnobotanical study is significant for different actors of the Swiss medicinal landscape public outreach is an important aspect of the thesis. The first article 'Herbs in the medicinal landscape of Switzerland' gives an overview of our ongoing study and insight in preliminary results. The article was published in 2012 in the Swiss Journal of Integrative Medicine which is read by academic and non-academic health professionals.

The second text results from an oral presentation at the Meeting of the Swiss Medicinal Society of Phytotherapy (Nov. 2013), asking the question: What can folk medicinal practices contribute to a modern concept of phytotherapy? We highlighted the following four aspects of folk medicinal practices that complement modern phytotherapy: 1) medicinal plants for prevention, detoxification and as general tonics, 2) empowerment in the healing process through self-activity, 3) cultural context of medicinal plant use as mirrored in legends, myths and folk beliefs, and 4) organoleptic properties of medicinal plants. The two latter aspects may contribute to a positive meaning response when using familiar plants.

Furthermore, two workshops were held to foster an awareness-raising process among different actors of the Swiss medicinal landscape. Motives and obstacles in the use of medicinal plants were discussed thoroughly. A demand for continuing communication between the different stakeholders became obvious and as such the two workshops laid a ground for future exchange.

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CHAPTER 2

WHO ARE THE HERBALISTS OF TODAY'S SWITZERLAND AND WHAT IS THEIR PLANT KNOWLEDGE? A PRELIMINARY ANALYSIS FROM AN ETHNOBOTANICAL PERSPECTIVE[2]

with Reinhard Saller and Caroline S. Weckerle [3]

Abstract

Background: Herbal medicine is a popular part of primary health care in Switzerland. In this study we are interested in the herbalists of the German speaking part of Switzerland and their plant knowledge and use. Following an ethnobotanical approach, we ask, who are the people with broad, empirical medicinal plant knowledge and what are the plants they know and use? We aim to consider different areas of the medicinal landscape including biomedicine, complementary and alternative medicine and self-medication.
Material and methods: A total of 61 expert interviews were conducted from February 2010 to November 2011. Knowledge transmission was tracked by asking the herbalists for their most important sources and comparing the documented medicinal plants with a comprehensive selection of historical and recent popular and scientific herbals.
Results: A total of 254 medicinal plant species, belonging to 218 genera and 87 families, were recorded with a total of 934 use reports. Predominantly leaves and flowers are used for the treatment of dermatological, respiratory, nervous, and gastrointestinal problems. Books ranging from recent to historical herbals form an important plant knowledge source.
Conclusions: Medicinal plants are used for self-medication and professional health care and despite different underlying medicinal concepts and philosophies, herbalists largely agree on the most important medicinal plant species.

[2] Published as: Dal Cero, M., Saller, R., Weckerle, C.S., 2015. Herbalists of Today's Switzerland and Their Plant Knowledge. A Preliminary Analysis from an Ethnobotanical Perspective. Forsch. Komplementmed. 22:238–245.

[3] Research design: MDC, CSW, RS; Fieldwork: MDC; Statistical analysis: MDC, CSW; Writing: MDC, CSW.

Introduction

In traditional communities and societies usually a variety of specialists are responsible for human well-being and primary health care. These may include healers, bone setters, midwifes, herbalists, ritual specialists, religious specialists, and mediums among others, all of them in different ways involved with the complexity of human health and well-being [1, 2, 3]. Nowadays, almost everywhere on earth and even in very remote areas, biomedical products and/or biomedical facilities either complement or dominate the medicinal landscape [4, 5]. This is particularly the case for so-called industrialized countries, albeit the above mentioned diversity continues to exist and tends to be subsumed as complementary or alternative medicine [6, 7].

Plants play an important role in any medicinal landscape. Phytotherapy can be part of biomedical practice, so-called alternative medicine or self-medication. In ethnobotanical studies among traditional or rural societies the term "herbalist" usually refers to a type of medicinal specialist who is especially knowledgeable on medicinal plants and mainly treats patients with plant based remedies [4, 8]. Plant medicine is either prepared by the herbalist or by the patient's family according to the received recipe.

While it is obvious that herbal medicine is a popular part of primary health care in Switzerland [9, 10], the term "herbalist" cannot be applied in the same way as it is often used in the context of ethnobotanical studies among traditional societies. For example, in Switzerland, the production of plant remedies is professionally separated from therapy. While pharmacists are responsible for the former, medical doctors and other practitioners take care of the later. It is only in the field of self-medication (homemade remedies) where collection, preparation and administration of plants can legally be performed by one and the same person. Thus, if we are interested in medicinal plant knowledge and use in Switzerland, we do not only have to consider the practitioners, but also include the producers of herbal medicine.

We here borrow the term "herbalists" from ethnobotanical studies for the Swiss medicinal landscape and use it as an umbrella term for medicinal plant specialists. We define it as follows: herbalists are persons who have empirical medical plant knowledge. They may cultivate and collect medicinal plants and/or process the plants and/or administer medicinal plants. This goes in line with the German translations of English "herbalist", French "herboriste", and Italian "erborista", which always include both, the "Kräuterarzt" (practitioner) and the "Kräutersammler" (collector/seller) [11, 12, 13]. For our study we translate herbalist as "Kräuterkundige/r".

The diversity of medicinal plants documented in herbals and medicinal plant books relevant for Switzerland was at its peak during the renaissance, and slightly decreased afterwards, with a total of

around 768 species of the Swiss flora documented over the last centuries [14]. Ethnobotanical studies conducted in specific geographical regions of Switzerland hardly document any plant use not previously mentioned in these plant books [ibid.].

In this study we are interested in the herbalists of the German speaking part of Switzerland and their plant knowledge and use. Following an ethnobotanical approach, we ask, who are the people with broad, empirical medicinal plant knowledge and what are the plants they know and use?

With this approach we aim to consider different areas of the medicinal landscape including biomedicine, complementary and alternative medicine and self-medication. We try to answer the question how diverse is plant use among different practitioners and to what degree the different backgrounds and schools are mirrored in the medicinal plants known and used.

Methods

Switzerland harbours four linguistically and culturally distinguishable areas, the French, German, Italian, and Romansh speaking part. We here confine our research to the German speaking part of Switzerland, considering both, urban as well as rural regions (Fig. 3.1).

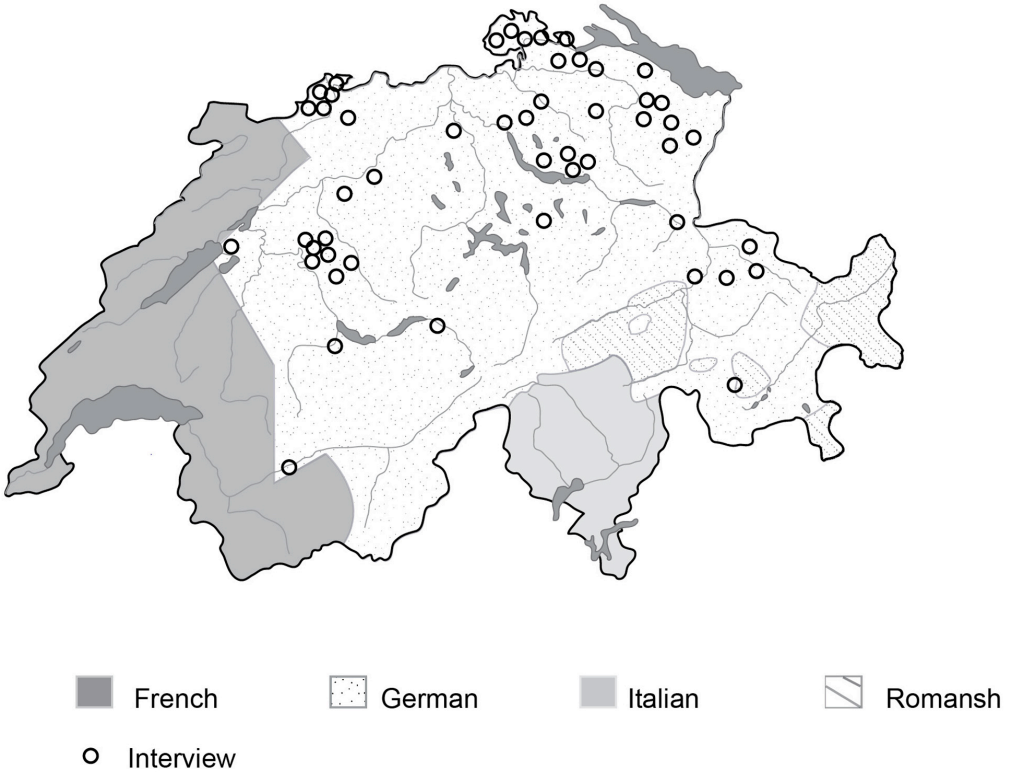

Fig. 2.1. Switzerland with the German, French, Italian, and Romansh speaking parts shaded in in different colors. The black circles indicate where the interviews took place.

Herbalists (German "Kräuterkundige") were found by stratified snowball sampling [15]. Key interviewees, representing different fields of the medicinal landscape such as biomedicine, complementary and alternative medicine (CAM), and self-medication were asked to name other persons whom they perceive as "kräuterkundig". Semistructured expert interviews were conducted by the first author from February 2010 to November 2011 (questionnaire cf. Appendix 1). A total of n_{total}=61 expert interviews were conducted and complemented with three group interviews (n_1=5, n_2=6, n_3=4). The participants of the group interviews were chosen according to the main fields of medicinal landscape and used to cross-check the information from the expert interviews.

The age of the herbalists ranged from 30 to 70 years, with most persons being between 50 and 60 years old. Totally 32 of the herbalists completed a certified training in phytotherapy, and 17 a biomedical training (nurse, medical doctor or pharmacist). Out of the 61 interviewees 40 (25 female/15 male) use medicinal plants in a professional context as CAM (complementary and alternative medicine) therapists (17), herb merchants (4), farmer (2), gardeners (3), pharmacists (3), teachers (3), nurses (4), artist (1), cosmetics manufacturer (1), medical doctor (1), or remedies manufacturer (1). The remaining 21 interviewees (19 female/2 male) use their medicinal plant knowledge in a private context only. For the analysis we grouped the herbalists into three equally sized groups, non-professional herbalists (laypeople), CAM therapists and other professionals (without CAM therapists).

The herbalists were asked for the most often used medicinal plants (freelist), their use, routes of administration and preparation. In addition, they were asked to name the five most important plants. For the analysis each citation of a particular part of a specific plant for a specific use was recorded as one use report (UR). The routes of administration were grouped into systemic (internal) applications, topical applications and inhalation, and uses were grouped into 12 disease categories related to organs and symptoms (cf. Appendix 2). The categories are basically following Leonti et al. [16]. Furthermore, a total of n_{inf}=51 of the herbalists were asked for their main source of medicinal plant knowledge. The information provided by n_{inf}=41 of them was useful for the analysis.

In a few cases we use the species complexes (aggregates, agg.) as defined in 'Flora indicativa' [17] as proxy for the taxa mentioned by herbalists (e.g. *Alchemilla alpina* agg., cf. Appenix). Nomenclature follows the plant list [18], family names the APG system [19 onwards].

To track knowledge transmission we decided to compare the documented medicinal plants with a comprehensive selection of historical and recent popular and scientific herbals as listed in Dal Cero et al. [14]. Since the author names provided by the herbalists as important sources were not always linked to specific books/editions, this was a more convenient way for the analysis.

Relative over- and underrepresentation of specific plant families, habits and habitats among the documented medicinal plants in relation to the Swiss flora were analysed using the Bayesian approach following Weckerle et al. [20].

Results

Medicinal plant knowledge of herbalists in Switzerland

A total of 254 medicinal plant species, belonging to 218 genera and 87 plant families, were recorded with a total of 934 use reports. They are listed in Appendix 3, where the scientific and vernacular names, habit and habitat of the species, plant parts used, a description of the use and the number of use reports are given.

Most herbalists (59) emphasized that they prefer to use native plants. Of the documented species and aggregates 221 (87%) are listed in the 'Flora Helvetica' [21] as occurring in Switzerland, making up 9,4% of the Swiss Flora (total number of vascular plants, i.e. species and aggregates, of Switzerland = 2358, estimate based on [17] aligned with [21]). Of them 109 (50%) are indigenous, 68 (31%) archeophytes, and 42 (19%) neophytes. The remaining 32 (13%) are Mediterranean, tropical or subtropical species not included in the Swiss flora. The only non-vascular plant documented is the lichen *Cetraria islandica*.

Only 10 species were mentioned by more than 20% (13) of the informants, in particular *Hypericum perforatum* (21 herbalists), *Urtica dioica* (19), *Symphytum officinale* (18), *Taraxacum officinale* (16), *Calendula officinalis* (14), *Matricaria chamomilla* (14), *Salvia officinalis* (14), *Thymus vulgaris* (14), *Melissa officinalis* (16) and *Achillea millefolium* (13). Overall, 129 species were listed by 2 to 12 of the interviewees, and 107 were mentioned only once. Figure 3.2 lists the medicinal plants with more than 10 use reports (UR) indicating topical and systemic administration.

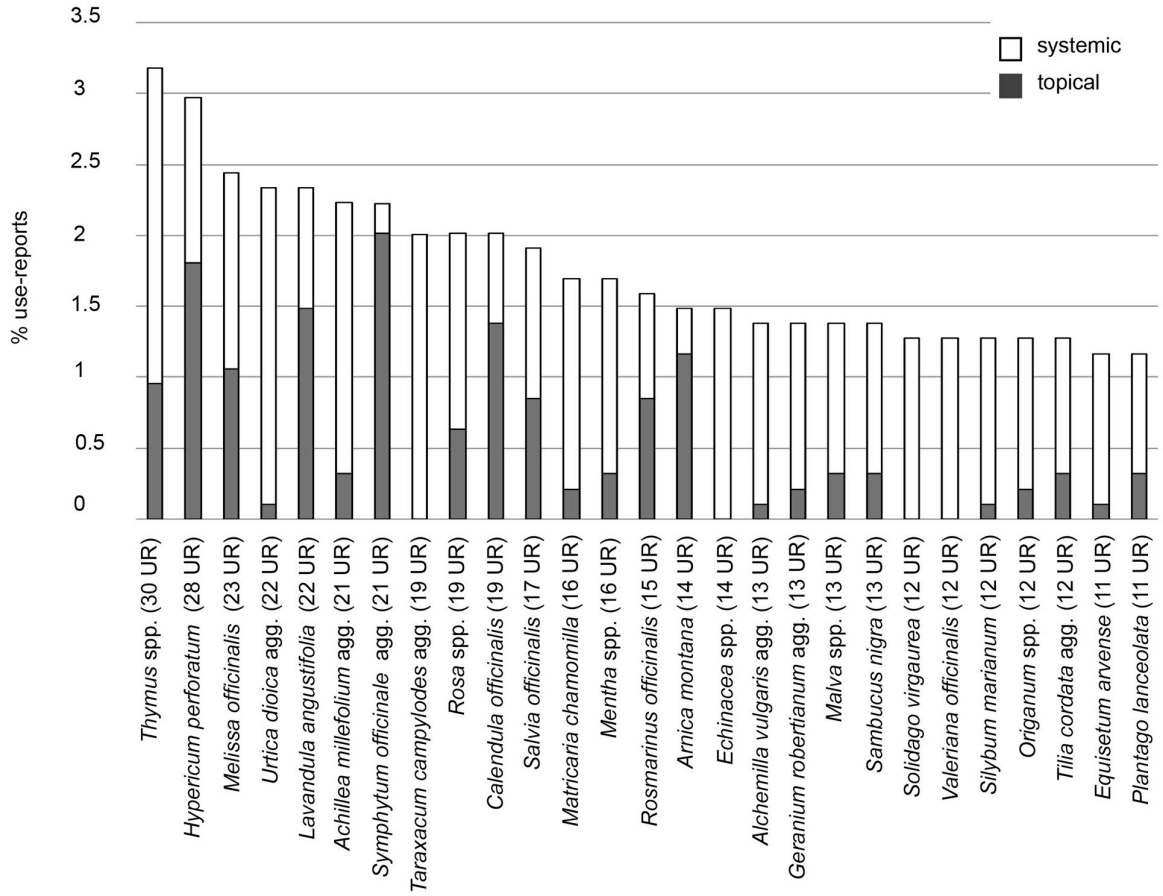

Fig. 2.2. Species with more than 10 use reports (n_{UR}=934).

The documented plants mainly belong to the Asteraceae, Lamiaceae, Rosaceae, Apiaceae, Brassicaceae and Fabaceae (Fig. 3.3A). However, relative to the family size, only the Apiaceae, Lamiaceae and Rosaceae are significantly overrepresented in our dataset, whereas the Caryophyllaceae, Cyperaceae, Orchidaceae and Poaceae are underrepresented.

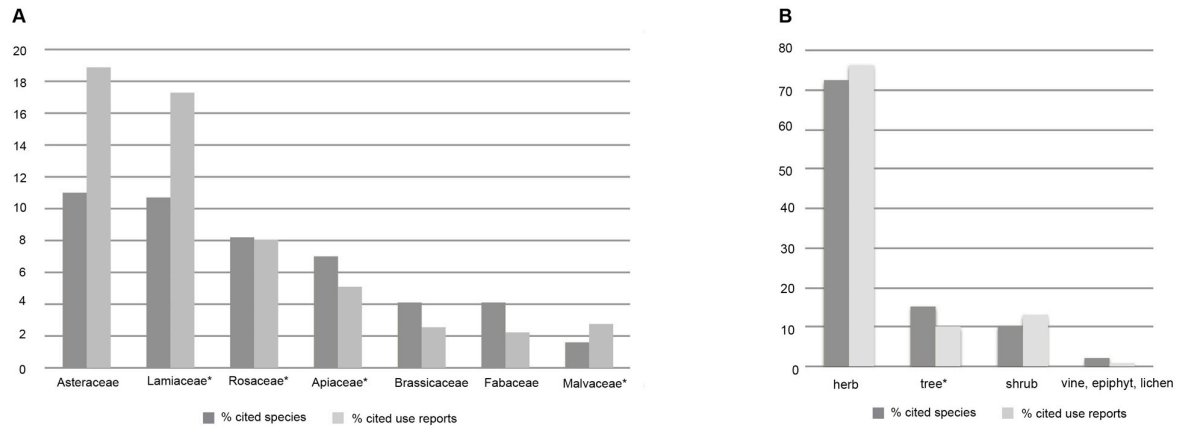

Fig. 2.3 A) Plant families comprising the majority of the cited species; B) Habit of the medicinal plant species (n_{sp}=254; UR n_{UR}=934). *overrepresented plant families relative to the Swiss flora.

The documented plants are mainly herbs, but relative to their natural occurrence trees are overrepresented in our dataset (Fig. 3.3B). The same is true for archeophytes. Regarding habitats, forest plants are overrepresented and mountain and marsh plants are underrepresented.

Medicinal plant use

The informants collect 47% of the cited species in their natural habitats or grow the herbs in the garden, while 34% are bought either as dried herb or as manufactured remedy or phytopharmaceutical; 19% of the species are either collected or bought. Figure 3.4 shows preferences of plant parts used and preparations.

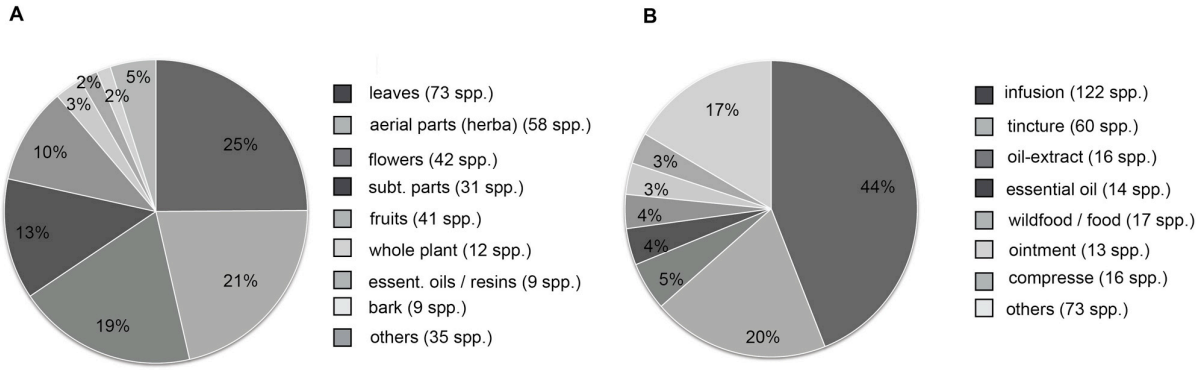

Fig. 2.4 Shares of A) Plant parts used (percentage of use reports n_{UR}=934); B) Preparation forms (percentage of use reports n_{UR}=934).

Most of the species are either used systemically (75%; internal, oral application), or topically (23%; application on skin or mucosa). Few species were mentioned to be used for inhalation (2%; smoke, steam, essential oil) or magical practices (<1%; e.g., protection of stables and homes).
The different disease categories mentioned are shown in Fig. 3.5.

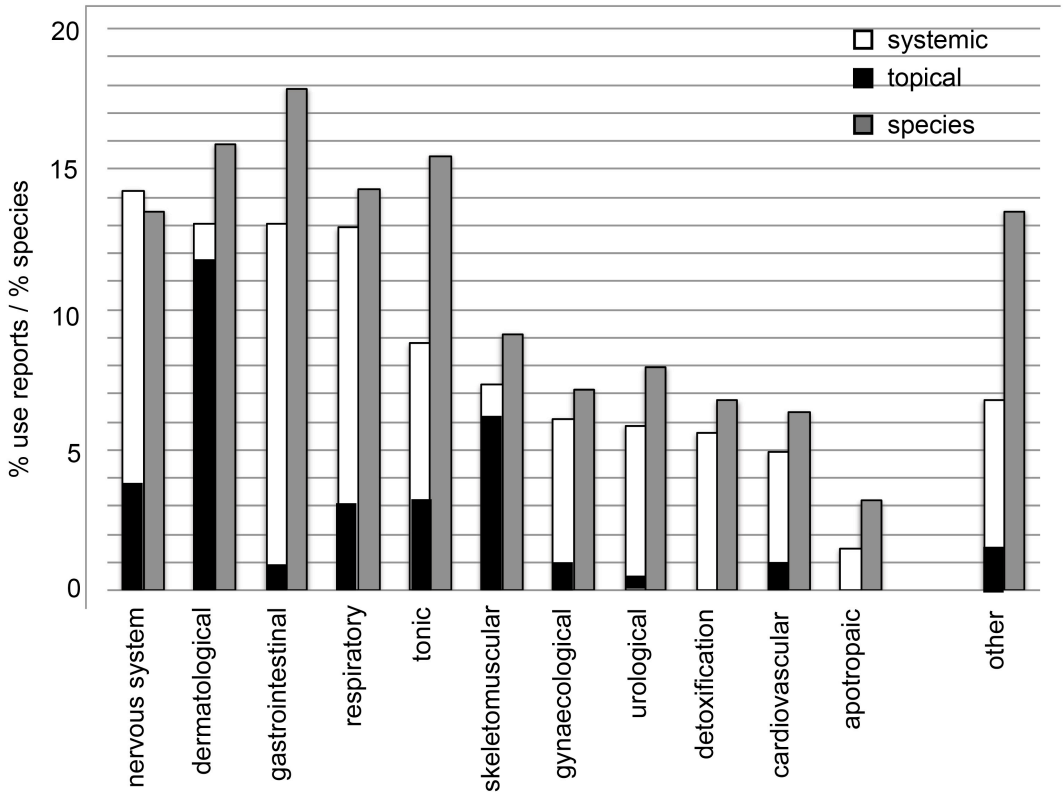

Fig. 3.5 Major disease categories: percentage of use reports compared to the percentage of species (n_{UR}=920; n_{sp}=254).

Herbals and teachers as important sources of knowledge

As knowledge source the informants consult in everyday work books of totally 22 different authors (Fig. 3.6). Seven of these authors were also mentioned as teachers (i.e. important persons, the informants know personally).

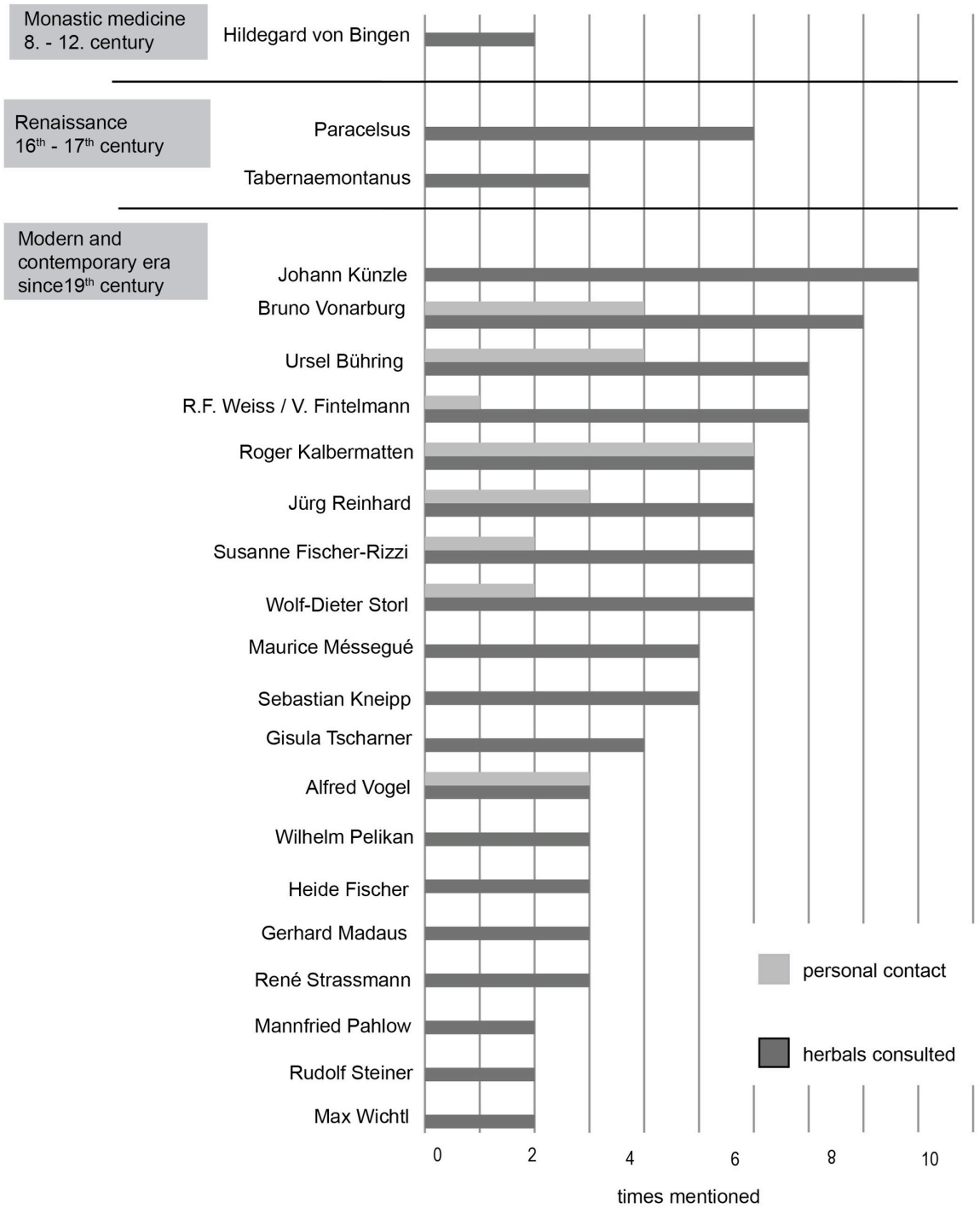

Fig. 2.6 Authors of medicinal plant books regularly consulted by herbalists (dark grey); authors that the herbalists know as teachers (light grey) (n_{inf}=41).

Beside one species from the Swiss flora (*Silene flos-cuculi*) and one exotic species (*Okoubaka aubrevillei*), all of the currently used medicinal plants are documented in the considered herbals of previous centuries and decades (Fig. 3.7).

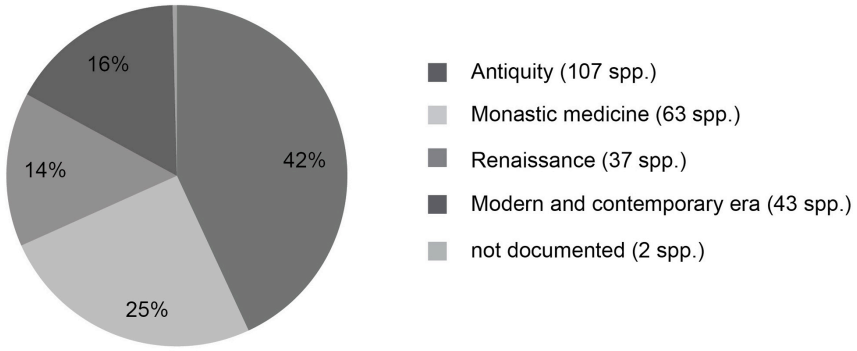

Fig. 2.7 Percentage of medicinal plants documented for the first time in different time periods (n_{sp}=254)

Plant preferences among the three subgroups of herbalists

Figure 3.8 shows the similarities and differences between the non-professionals (laypeople), CAM therapists and other professionals regarding the five most important plants they use. Figure 3.9 shows the overlap between these three groups in respect to their knowledge sources.

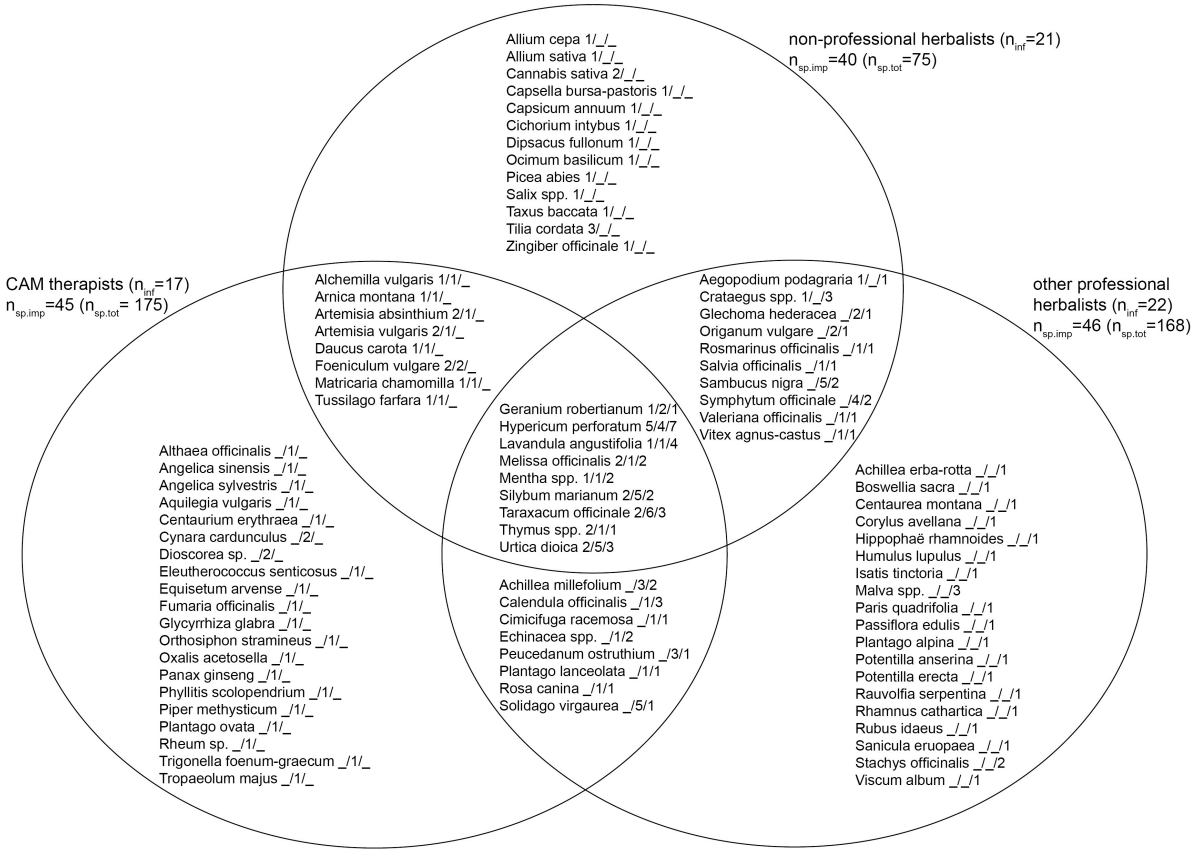

Fig. 2.8 Medicinal plant preferences of non-professional herbalists (laypeople), CAM therapists, and other professional herbalists. The figure is based on the five most important species ($n_{sp.imp}$) mentioned by the interviewees. The total number of species mentioned in the freelists ($n_{sp.tot}$) is also given. The numbers indicate use reports in the different subgroups: non-professionals/CAM therapists/other professional herbalists.

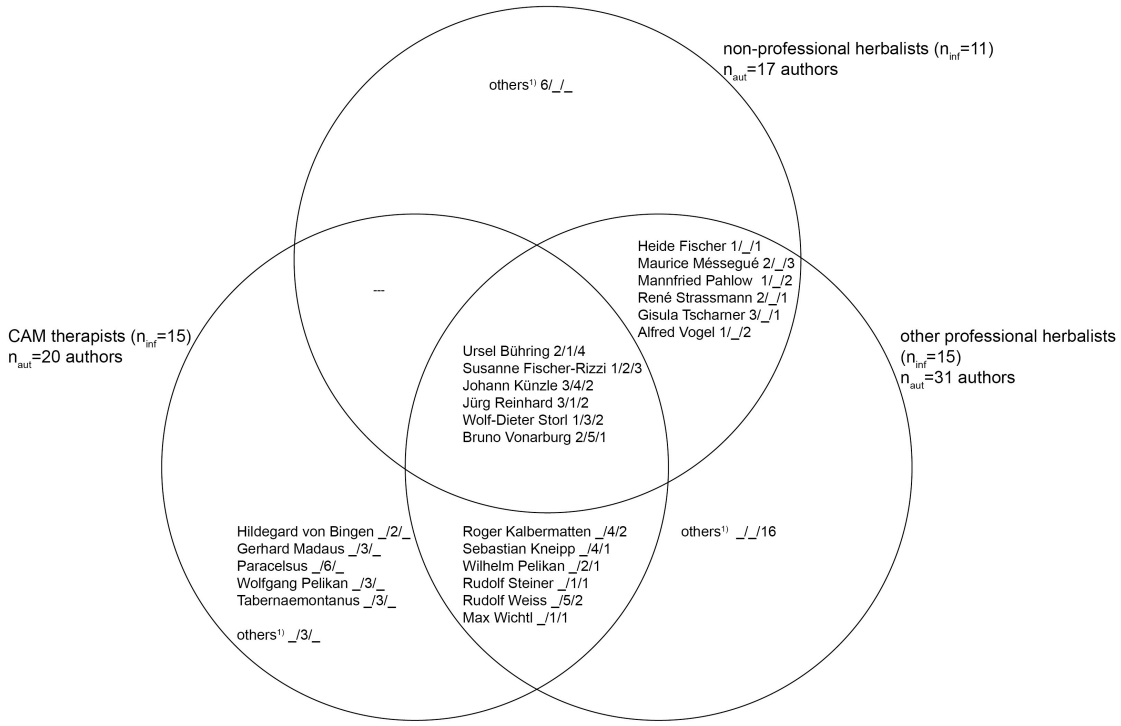

Fig. 2.9 Authors reported as important knowledge sources by n_{inf}= 41 informants from different subgroups: non-professional herbalist (laypeople), CAM therapists, and other professional herbalists.
[1] 'Others' include authors with only one report.
The numbers indicate use reports in the different subgroups: non-professional herbalists/CAM therapists/other professional herbalists.

Discussion

Herbal medicine is a popular part of primary health care in Switzerland [9]. Like in other western countries the Swiss medicinal landscape is characterized by pluralism and under biomedical supremacy a vibrant network of complementary and alternative medicine (CAM) and popular medicine exists. Drug use, including medicinal plants, is highly regulated and this legal framework strongly influences plant knowledge and use especially in the professional sector. This is reflected in the fact, that the plant knowledge we collected comprises almost exclusively well-known and good documented medicinal plants.

Herbalists, defined as persons who have empirical medical plant knowledge and are perceived as knowledgeable by others, can be found in different areas of the Swiss medicinal landscape including biomedicine, CAM and self-medication. Despite different philosophies and etiological models underlying the use of medicinal plants by herbalists, we found a remarkable similarity among the

most important species used. These include so-called detoxifying plants like *Taraxacum officinale* (e.g. roots), *Urtica dioica* (e.g. leaves) and *Silybum marianum* (e.g. seeds). These plants are known for their diuretic, cholagogue and hepatoprotective effects [22]. Detoxification is a common concept within CAM and self-medication for disease prevention, including the prevention of severe diseases like diabetes or cancer. Biomedicine rather focuses on the hepatoprotective effects of these plants in cancer treatment [23, 24, 25, 26]. Common among all practitioners is also the topical and systemic use of *Hypericum perforatum*. This species is known for its complex multicomponent composition, which allows for diverse uses and remedies [27]. Intensive promotion of Saint John's Wort as phytotherapeutical and high media attention probably also promoted its widespread use. Broadly used are also *Lavandula angustifolia*, *Melissa officinalis* and *Mentha* spp. These are well-known and well-researched plants with a wide spectrum of uses ranging from wellness and well-being to specific medicinal uses as sedative and digestive drugs [28, 29, 30, 31].

Overall, non-professional herbalists (people who use plants for self-medication) use a smaller number of medicinal plants than professionals. This is in line with findings from other ethnobotanical studies from Switzerland [32, 33, 34]. We also find differences between professionals and non-professionals in their understanding and definition of medicinal plants. While professionals tend to clearly separate medicinal plants from food plants, probably influenced by the official regulations on medicinal plant use, non-professionals have a slightly different understanding and broader spectrum of what they perceive as medicinal. They often use typical food plants for self-medication such as the topical administration of potatoes or cabbage against joint pain or onions against cough; or they prepare wild vegetables as healthy food. Consequently the border between food and medicinal plants becomes blurred and a species is perceived as food or medicine, depending on the use-context. This phenomenon has been widely shown in studies from within and outside Europe [35, 36, 37, 38]. While non-professional herbalists are less influenced by regulations and non-legally available plants, such as *Cannabis sativa*, were only mentioned in this group as important medicinal plants, professional herbalists and CAM practitioners prefer well established plants with clear legal directives.

In total, the plants used by herbalists are well-known for their medicinal use and are documented in books. Almost half of them (45%) have been documented since antiquity [14]. Herbalists mentioned as important knowledge sources mainly recent medicinal plant books, among them the very popular books of Künzle [e.g., 39, 40] and Vonarburg [e.g., 41] beside the textbooks of Bühring [e.g., 42] and Weiss [e.g., 43], and books with a very personal approach to medicinal plants like Storl [e.g., 44, 45] or Fischer-Rizzi [e.g. 46]. Furthermore, CAM practitioners also refer to old books from the monastic

period and renaissance compiled by authors like Hildegard von Bingen, Tabernaemontanus or Paracelsus. These books, however, are all available as modern editions [e.g., 47, 48, 49].

Botanical patterns among the documented species coincide with our findings for the medicinal flora of Switzerland as a whole [14]. Lamiaceae, Rosaceae and Apiaceae are overrepresented plant families, and trees and forest plants are overrepresented live forms and habitats in our dataset. Interestingly, alpine plants are significantly underrepresented. This stays in contrast to the vibrant tradition of medicinal plant cultivation and collection in the Swiss Alps [50]. This discrepancy is due to the fact that most medicinal plants cultivated in the Alps are non-alpine plants such as *Thymus* spp., *Mentha* spp., or *Melissa officinalis* [51] (alpine plants are defined as species growing above timber line [17]).

Compared with previous ethnobotanical studies from Switzerland we find a total overlap of 57.1% of the documented species [32, 33, 34, 52, 53]. Compared exclusively to studies from the German speaking part, the overlap increases to 63.4%. We argue that albeit the species used are generally well known medicinal plants, we do find regional differences and local substitutes for specific plants. Furthermore, while we have a strong focus on the professional sector in our study, the above ethnobotanical studies mainly focus on non-professionals, which leads to the differences found among the species mentioned.

Conclusions

Medicinal plants are used for self-medication and professional health care in Switzerland. Herbalists, i.e. medicinal plant specialists with broad empirical plant knowledge, are found in different parts of the medicinal landscape from complementary and alternative medicine (CAM) to biomedicine. Of the ca. 250 species mentioned by herbalists, predominantly leaves and flowers are used for the treatment of dermatological, respiratory, nervous, and gastrointestinal problems. Furthermore, a large variety of plants are used as tonics for disease prevention and to strengthen the immune system. All species mentioned are well-known medicinal plants.

Despite different underlying medicinal concepts and philosophies, herbalists largely agree on the most important medicinal plant species. Among others these include the so-called detoxifying plants. Nevertheless, differences between herbalists with a biomedical or CAM background and non-professional herbalists exist, e.g. in specific plant preferences or the understanding of the continuum between food and medicinal plants.

Books ranging from recent to historical herbals form an important plant knowledge source of herbalists. The historical herbals in use are all available as modern editions and often serve as source

of inspiration. Broad empirical plant knowledge thus forms an important complementation to evidence based phytotherapy.

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Supplemental Material: see Appendix

Questionnaire

Table: Use categories

Table: Medicinal plants used by herbalists in Switzerland

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CHAPTER 3

THE USE OF THE LOCAL FLORA IN SWITZERLAND:

A COMPARISON OF PAST AND RECENT MEDICINAL PLANT KNOWLEDGE[4]

with Reinhard Saller and Caroline S. Weckerle[5]

Abstract

Ethnopharmacological relevance: This analysis of documented medicinal plants of the Swiss Flora over the last two millennia provides a rich source of knowledge on earlier uses of plants and use patterns of the local flora.
Aim of the study: We ask which local plant species were used during different time periods of the last 2000 years and how the numbers of species and the use intensity of specific plant families, growth forms and habitats changed over time.
Materials and Methods: Totally 25 herbals from the antiquity, monastic medicine, Renaissance, early modern era and the contemporary time as well as five recent ethnobotanical studies were considered. Use patterns were analysed with the Bayesian approach.
Results: A total of 768 species, i.e. 32 % of the vascular plants of the Swiss Flora have been documented as medicinal plants. Numbers increase until the monastic period (366 spp.) and the Renaissance (476) and remain relatively stable since then (modern and contemporary era: 477). But, 465 formerly documented species do not occur in the ethnobotanical studies and thus seem not to be used any more. Overall, 104 species are documented through all time periods. Archeophytes, trees and forest plants are generally overrepresented in herbals from all time periods while plants from above the timberline are generally underrepresented. Most widely used are the Lamiaceae and Apiaceae.
Conclusion
A constant body of medicinal plant knowledge in Switzerland exists since ancient time. This knowledge was always influenced by knowledge from neighboring countries and no "typical Swiss specialties" seem to exist. Medicinal plants are not randomly chosen from the available flora. Certain species are deliberately introduced others are neglected. This process, which is still ongoing, can be traced back with the help of herbals to the antiquity.

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[5] Research design: MDC, CSW, RS; Data compilation: MDC; Statistical analysis: MDC, CSW; Writing: MDC, CSW.

Introduction

Main periods of medicinal history in Europe are classical antiquity, followed by the period of monastic medicine, Renaissance, and finally the modern era shaped by natural sciences (Porter, 1997).

The written tradition on herbal medicine of the classical antiquity (ca. 500 BC until the 5th century CE) is characterized by the Greek natural philosophy. The documented medicinal plant knowledge is based on personal experience of the authors but is also influenced by earlier written sources such as the Egyptian papyri and the Babylonian clay tables (Leonti et al., 2010). As a late exponent of classical antiquity Pedanius Dioscorides (ca. 40–90 CE) laid the foundation for herbals and pharmacopeias in later periods (Leonti et al., 2010). In his "Materia Medica", Dioscorides compiled ancient medicinal plant knowledge in a short and compact way as it is done in scientific and popular herbals until today (Berendes, 1902).

For Switzerland, the written history begins with the Roman invasion (e.g., descriptions from Julius Caesar 100 – 44 BC, Strabo the Geographer, 64 BC – 19 CE, or Plinius the Elder, 23 – 79 CE). Romans conquered today's area of Switzerland between the 2nd century BC and 13 BC. Their transalpine roads lead to an increased trade and cultural exchange, also on medicinal plant knowledge (Bätzing, 2003).

After the collapse of the Roman Empire in the 5th century CE political, economic and social instability prevailed in Europe. This period ends with the establishment of the early Universities around 1400 CE. During that time the ancient written tradition on herbal medicine was preserved in Christian monasteries. Spreading out from Italy, they were founded during Early Middle Ages even in remote alpine areas and were the intellectual centers of education and medicine (Stoll, 1992). The Benedictines were especially prominent due to their explicit observance to care for the sick (Rule of Saint Benedict) and their establishment of libraries (Stoll, 1992; Mayer et Goehl, 2001). In Switzerland, the first library was established 747 CE by the expanding Benedictine monastery in St. Gallen. Important for the monastic medicine were the magnificently illustrated codices that compiled, reedited and adapted ancient medicinal knowledge in order to pass it on (Niederer, 2005). Adaptation to local conditions was necessary as Dioscorides' Materia Medica contained many Mediterranean species that were scarcely available north of the Alps and thus expensive. The "Lorscher Pharmacopoeia" from the 8th century, for example, compiles medicinal and herbal recipes based on ancient Greek medicine, but influenced by Arabic and Byzantine knowledge as well as local folk practices (Stoll, 1992).

The Renaissance period brought a new general interest in antique Greek literature including the classic writings on herbal medicine and *materia medica* in general (Porter, 1997). The invention of letterpress

printing allowed for a wide distribution of compiled medicinal plant knowledge, and new exotic species from the Americas were incorporated as medicine (Porter, 1997).

The modern era began in the 16th century when Enlightenment and evolving natural sciences started to influence medicine. Subsequently, humoral pathology was largely abandoned as prevailing medicinal concept and the use of medicinal plants was related to specific organs (Hoefert and Uehleke, 2009). In the 19th century scholarly medicine became strongly linked with natural sciences. The scientific achievement of isolating single plant compounds triggered the development of new pharmaceuticals. In the same century the term folk medicine was coined by medical doctors to distinguish the practices of traditional healers from their own knowledge and therapies (Wolff, 2008). Naturopathy arose as a countermovement to scholarly medicine including new fields such as Homeopathy, beside traditional and magical medicinal practices. In Switzerland Johann Künzle (1857-1945) and Alfred Vogel (1902-1996) were among the most influential and popular herbalists in the late 19th and early 20th century (Melzer, 2003). Johann Künzles' "Chrut und Uchrut" (Herbs and weeds; first published in 1911), and Alfred Vogel's "Der Kleine Doktor" (The little doctor; first published in 1952) became best and long sellers and reached editions of over 2 million each.

In contemporary times medicinal plant books with popular, scientific and/or spiritual emphasis abound, including popular herb books focusing on the local Swiss flora (e.g. Vonarburg, 1988; Kalbermatten, 2002; Dal Cero, 2009). Recent ethnobotanical studies in Switzerland demonstrate that medicinal plant knowledge and use still plays a role among the rural population, but lost on importance even in remote alpine regions during the second half of the 20th century (Poncet, 2005, for the Napf-Region in Central Switzerland; Broquet, 2006, for the French-speaking Jura; Brühschweiler, 2008, for the inner alpine region; Poretti, 2009, for the Italian-speaking southern part of Switzerland; Wegmann 2013, for the Grisons).

This paper deals with the question, how the flora of Central Europe equaling the area of nowadays Switzerland was medicinally used over the last 2000 years. We ask 1) what local plant species were used during different time periods, and 2) how the diversity of species changed over time. We also analyse use intensity of specific plant families, growth forms and habitats during different time periods.

This study provides a basis for the analysis of medicinal plant knowledge and use in today's Switzerland. It gives a framework for the interpretation of recent ethnobotanical studies and at the same time points out a rich source of historically documented medicinal plants no longer in use today.

Study site and methods

Geography of Switzerland

Switzerland, with an area of 41 285 km^2, is located in the southeastern part of Central Europe (6 – 11° E, 46 – 48° N)**.** Elevations range from around 200 m in southern Ticino to over 4600 m in the Central Alps (Lauber and Wagner, 2012). The landscapes are topographically and geologically very diverse due to the formation of the Alps and the impact of glaciations during the last ice ages. Three major biogeographic areas can be distinguished: The Jura Mountains, the Central Plateau and the Alps (Fig. 2.1). The Jura, with mountain ranges of up to 1700 m, forms the north-western boundary of Switzerland. The ranges mainly consist of sediments such as limestone and marl. The Central Plateau, a molasse basin, stretches from the Jura Mountains in the northwest to the alpine foothills (Prealps) in the south with an elevation from 400 to 600 m. This hilly to flat area covers ca. 30% of Switzerland. The Alps are characterized by high geological and climatic diversity and with 65% of surface make up the largest part of Switzerland (Lauber and Wagner, 2012). In the north they are separated from the Central Plateau by the Prealps and in the south they are bordered by the Plain of the Po.

The four languages German, French, Italian, and Romansh with their countless vernaculars characterize the four culturally distinct regions of Switzerland.

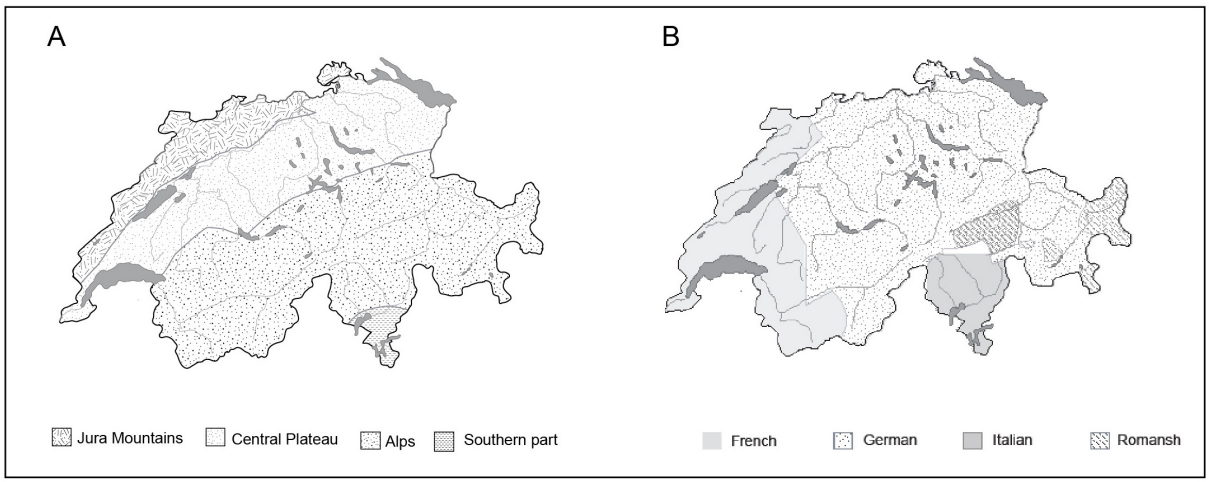

Fig.3.1 Switzerland with the major biogeographic and cultural areas; A, the three major biogeographic regions: Jura Mountains, Central Plateau and Alps; B, the four languages: German, French, Italian, Romansh.

Climate

The climate ranges from almost Mediterranean in southern Switzerland to Arctic in the high mountains. The Alps act as barrier between the warmer South and the North with cooler average temperatures. In the west humid and mild sea air from the Atlantic Ocean causes a relatively mild climate whereas the

east is more continental. Most of Switzerland has annual precipitations between 1000-2000 mm except the dry inner-alpine valleys (Valais and Engadin) with less than 800 mm (Landolt, 1984).

Flora

The diversity of landscapes causes relatively high plant diversity in Switzerland. Its area covers only 0,4% of Europe but harbors more than 20% of the European diversity of vascular plants, i.e., around 2500 species (Landolt, 2010; Lauber and Wagner, 2012). This is due to the high plant diversity of the Alps with a total of around 4500 species (Aeschimann et al., 2004; Gobet et al., 2010).

Since 5500 BC the anthropogenic impact on the vegetation steadily increased (Landolt, 1984; Gobet et al., 2010). Large parts of Central Europe became deforested which caused a dominance of only a few tree species. At the same time overall plant diversity increased due to a rising number of open habitats such as meadows and pastures. In today's Switzerland all vegetation, even in the high mountains, is under strong anthropogenic influence.

In this study we assess the total number of vascular plants of Switzerland based on the 'Flora indicativa' (Landolt, 2010) aligned with the 'Flora helvetica' (Lauber and Wagner, 2012). To get a more detailed insight into the use patterns of the Swiss flora we also include habitats, growth forms, and the time of invasion in Switzerland into our analysis (Landolt, 2010). For the time of invasion we differentiate between *indigenous plants*, *archeophytes*, i.e. species non-native to Switzerland but introduced before 1500 CE, and *neophytes*, i.e. species non-native to whole Switzerland but introduced after 1500 CE. As growth forms we use *geophytes*, i.e. species that overwinter with buds under or directly on surface, *herbs,* i.e. therophytes including biennials, *shrubs*, i.e. woody plants < 4 m in height, and *tree*s, i.e. woody plants > 4 m in height (Landolt, 2010). To get an impression on which habitats are preferred to collect medicinal plants we analyzed ecological groups of plants which we roughly use as indicator for habitats (Landolt, 2010).

Data compilation

Data are extracted from various books and ethnobotanical publications, aiming at covering medicinal plant diversity of the different time periods. The books include the most important Middle European herbals from classical antiquity to Renaissance (Heilmann, 1973). For the antiquity we exclusively rely on Berendes' (1902) translation of Dioscorides' materia medica and on his species identification. Also for the monastic medicine and Renaissance we included herbals with recent editions and scientific plant names. For Lonicerus (1557) and Tabernaemontanus (1588), however, we relied on the original plant lists. From these we only included a few additional, easily identifiable species.

The choice of modern herbals is largely based on interviews with 61 herbalists who were asked about the medicinal plant books they use (unpublished data). The answers covered popular Swiss herbals (including folk medicinal practices), books on anthroposophic and Bach flower remedies, and scientific evidence based drug-descriptions.

In total, 25 books were used for the analysis. We only included books which increased the species lists of the different time periods (Tab. 2.1). All ethnobotanical studies available for Switzerland were considered (Tab. 2.2). Books additionally consulted but not included in the analysis as they did not contain information on additional plant species are mentioned in Tab. 2.3. Scientific plant names were checked for synonyms with the 'Flora indicativa' (Landolt, 2010) and the 'Flora helvetica' (Lauber and Wagner, 2012). Nomenclature follows the 'Flora indicativa', family names the APG system (Stevens, 2001 onwards).

Tab. 3.1 Books used for the analysis of medicinal plant diversity in Switzerland

Time Period	**Book title** «short title», (title of English translation)	**Author** (life data)	**First Edition**	**Place of origin**	**Notes**
Antiquity 1st century CE	Materia medica	Dioscorides Pedanios from Anazarbos (ca. 40 - 90 CE)	1st century CE	Asia minor	• Broad overview of Greek and Roman medicinal herb knowledge. • Totally ca. 500 species described; 343 occurring in CH. • Berendes (1902)*
Monastic medicine 8th – 12th century	Capitulare de villis vel curti imperiis	Benedictine monk	ca. 800	Benedictine Abbey of Reichenau, Germany	• One of the few secular sources of plant knowledge and practices from early Middle Age. • Chapter 70 contains a list of 89 plant species to be cultivated in the garden; 79 occurring in CH. • Strank and Meurers-Balke (2008)*
	Lorscher Pharmacopoeia	Anonymus	8th century	Benedictine Abbey of Lorsch, Germany	• Medical compendium (Codex Bambergensis Medicinalis 1) • Totally ca. 460 species described; 322 occurring in CH. • Stoll (1992)*
	«Macer floridus»	Odo Magdunensis Benedictine monk	ca. 1100	Bendedictine abbey	• Poem in hexameter about herbs' vigours (De viribus herbarum). • Standard reference of the monastic medicine. The place of origin is under debate as different early editions of the poem exist. • Totally 85 species described; 70 occurring in CH. • Mayer and Goehl (2001)*
	«Physica»	Hildegard von Bingen (1098 – 1179) Benedictine abbess	ca. 1151	Benedictine Abbey of Ruppertsberg, Germany	• The original manuscript is not preserved; later codices are all supplemented. • Totally ca. 300 species described, 198 occurring in CH. • Portmann (1991)*
Renaissance 16th – 17th century	«New Kreüterbuch»	Leonhart Fuchs (1501 – 1566) medical doctor, botanist, professor	1543	University of Thübingen, Germany	• Totally ca. 500 species described; 414 occurring in CH. • Dobat and Dressendörfer (2001)*
	«Kreuterbuch»	Adamo Lonicero (1528 – 1586) medical doctor, botanist	1557	Marburg, Frankfurt am Main, Germany	• More than 20 ed. until 1783 • Edition anno 1679*; index used only.
	«Neuw Kreuterbuch»	Tabernaemontanus; Jacob Theodor (1522 – 1590) medical doctor, botanist, professor	1588	Heidelberg, Germany	• Edition anno 1625*; index used only.

Modern to contemporary era since 19th century	So sollt ihr leben (Thus Shalt Thou Live)	Sebastian Kneipp (1821—1897) priest	1889	Wörishofen, Germany	• Kneipp, a Bavarian priest, was one of the founders of the naturopathic medicine movement. • Totally 47 species described; 42 occurring in CH. • Kneipp (2010)*
	Das grosse Kräuterheilbuch	Johann Künzle (1857 – 1945) priest, herbalist	1945	Wangs / Zizers, Switzerland	• Künzle was a popular herb priest and publicist in Switzerland. He mainly relied on the herbals of Tabernaemontanus and Kneipp. • Totally 159 species described; 154 occurring in CH. • Künzle (1945)*
	Précis de Phytotherapie	Henri Leclerc (1870 – 1955) medical doctor	1922	Paris, France	• Leclerc was a great phytotherapeutical practitioner and historian. • Totally ca. 210 species described; 192 occurring in CH. • Leclerc (1976)*
	Lehrbuch der Biologischen Heilmittel	Madaus Gerhard (1890 – 1942) medical doctor	1938	Leipzig, Germany	• Madaus was the founder of the Dr. Madaus & Co company producing herbal medicine and homeopathic remedies. • Totally 444 species described; 249 occurring in CH. • Madaus (1938)*
	Unsere Heilpflanzen	Hans Flück (1901 – 1971) professor for pharmacognosy	1941	Thun, Switzerland	• Flück compiled scientific and popular knowledge about medicinal plants mainly from Swiss alpine regions. • Totally 136 species described; 134 occurring in CH. • Flück (1941)*
	Der kleine Doktor	Alfred Vogel (1902 – 1996) herbalist	1952	Teufen, Switzerland	• Vogel was a popular expert in naturopathic medicine, a popular writer and the founder of a manufacture of herbal products. In 2002 the 72th edition of his book occurred. It was translated into 12 languages. • Totally 176 species described; 135 occurring in CH. • Vogel (1952)*
	Lehrbuch der Phytotherapie	Rudolf Fritz Weiss (1895 – 1991) medical doctor	1944	Stuttgart, Germany	• Weiss established modern phytotherapy as a part of biomedicine. • Totally 154 species described; 107 occurring in CH. • Weiss (1985)*
	Le Erbe	author n.n.	1977	Milano, Italy	• Totally ca. 300 species described; 263 occurring in CH. • Wurzer (2000)*; German translation.
	Phytotherapie: Traitement des Maladies par les Plantes	Jean Valnet (1920 – 1995) medical doctor	1983	Paris, France	• Valnet was an army physician and surgeon and published comprehensively on aromatherapy (essential oils) and medicinal plants. • Totally ca. 350 species described; 223 occurring in CH. • Valnet (1992)*

	Gesundheit aus der Apotheke Gottes	Maria Treben (1907 – 1991) herbalist	1980	Austria	• A very popular book, translated into more than 20 languages and with a total of more than 80 million copies (91th ed. in 2011). • Totally 58 species; all occurring in CH. • Treben (2011)*
	Die Original-Bach-Blüten Therapie (Bach-Flowers)	Mechthild Scheffer naturopath	1981	Hamburg, Germany	• Bach flower remedies are dilutions from flowers. They were developed in the 1930ties by the English bacteriologist, pathologist and homeopath Edward Bach (1886-1936). Since the 1980ties they are widely used in Switzerland. • Totally 38 species described; 33 occurring in CH. • Scheffer (2011)*
	Teedrogen und Phytopharmaka	Max Wichtl (ed.) professor for pharmacognosy	1984	Stuttgart, Germany	• Scientific compendium on herbs and herbal drugs; standard reference especially for pharmacies. • Totally 188 species described; 144 occurring in CH. • Wichtl (2009)*
	Natürlich gesund mit Heilpflanzen	Bruno Vonarburg herbalist	1988	Teufen, Switzerland	• Vonarburg is a popular expert in naturopathic medicine and a publicist. • Totally 102 species described; 96 occurring in CH. • Vonarburg (1988)*
	Phytotherapie; Klinische, pharmakologische und pharmazeutische Grundlagen	Reinhard Saller medical doctor, professor for naturopathy Jürgen Reichling professor for pharmaceutical biology Dieter Hellenbrecht professor for pharmacology and toxicology	1995	Zürich, Switzerland, Heidelberg, Germany	• Detailed monographs of thoroughly studied medicinal plants. • Totally 58 species described; 42 occurring in CH. • Saller et al. (1995)*
	Heilmittel-Fibel zur anthroposophischen Medizin	Henning M. Schramm veterinary and naturopath	1997	Schaffhausen, Switzerland	• Compendium of anthroposophic medicine. • Totally 154 species described; 108 occurring in CH. • Schramm (1997)*
	Praxis-Lehrbuch der modernen Heilpflanzenkunde	Ursel Bühring herbalist	2005	Heilpflanzenschule Freiburg i.Br., Germany	• Bühring is a German phytotherapist and founder of a phytotherapy school. • Totally 204 species described; 158 occurring in CH. • Bühring (2005)*

* edition used; for details see references.

Tab. 3.2 Ethnobotanical studies in Switzerland

References
Poncet, A., 2005. Pflanzen und Menschen im Emmental – Eine ethnobotanische Studie über den Kräuterhandel einer Bauernfamilie des Voralpengebiets. Master-Thesis, Université Neuchâtel, Switzerland.
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Brühschweiler, S., 2008. Plantes et Savoirs des Alpes; l'exemple du val d'Anniviers. Monographic SA, Sierre.
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Wegmann, U., 2013. Ethnobotanik im Prättigau. Medizinalpflanzen – Nutzung und Wissen. Master-Thesis Universität Zürich, Switzerland.

Tab. 3.3 Additionally consulted herbals, not considered for the analysis

Time Period	Reference
Monastic medicine 8th – 12th century	Stoffler, H.D., 1997. Der Hortulus des Walahfrid Strabo; aus dem Kräutergarten des Klosters Reichenau. 5. Aufl., Jan Thorbecke Verlag, Sigmaringen.
Renaissance 16th – 17th century	Wonnecke von Kaub, J., 1529. Gart der Gesundheit. Beck, Strassburg.
	Fretz, D., 1948. Konrad Gessner als Gärtner. Atlantis, Zürich.
Modern and contemporary era since 19th century	Bardeau, F., 1978. La pharmacie du bon dieu. Éditions Stock, Paris.
	Bianchini, F., Corbetta, F., 1980. Le piante della salute. A. Mondadori, Milano.
	Boros, G., 1980. Heil- und Teepflanzen. Ulmer, Stuttgart.
	Schneebeli-Graf, R. (Ed.) 1987. Chamisso, A., v., Illustriertes Heil- und Giftpflanzenbuch, 1827. Reimer, Berlin.
	Cousin-Zermatten, G., 1997. Recettes santé de nos grand'mères. Monographic, Sierre.
	Dal Cero, M., 2009. Unsere Heilpflanzen. Ott, Bern.
	Delaveau, P., 1982. Histoire et renouveau des plantes médicinales. Éditions Albin Michel, Paris.
	Felder, P., Glutz-Weber, J., 1990. Gesundheits-Brevier: Alternative Heilmethoden – praktisch erprobt. Yerbasanta, Arlesheim.
	Höhn-Ochser, W., 1986. Pflanzen in Zürcher Mundart und Volksleben: Zürcher Volksbotanik. Rohr, Zürich.
	Hostettmann, K., 2001. Tout savoir sur les plantes medicinales des montagnes. Favre, Lausanne.
	Kalbermatten, R., 2002.Wesen und Signatur der Pflanzen. AT Verlag, Aarau.
	Kummer, G., 1952. Schaffhauser Volksbotanik: die wildwachsenden Pflanzen. K. Augustin, Thayngen.
	Künzle, J., 1911. Chrut und Uchrut; Praktisches Heilkräuterbüchlein. Selbstverlag des Verfassers, Wangs.
	Losch, F., 1903. Kräuterbuch: Unsere Heilpflanzen in Wort und Bild. Schreiber, Esslingen & München.

	Mességué, M., 1975. C'est la nature qui a raison. Opera Mundi, Paris.
	Niederegger, O., Mayr, C., 2006. Heilpflanzen der Alpen: Gesundheit aus der Natur von A – Z. Tyrolia, Innsbruck.
	Pelikan, W., 2012. Heilpflanzenkunde: Der Mensch und die Heilpflanzen. 3 Bände. Verlag am Goetheanum, Dornach.
	Wartmann, B., 1874. Beiträge zur St. Gallischen Volksbotanik. Scheitlin und Zollikofer, St. Gallen.

Data analysis

To elucidate use patterns of specific families, habitats and growth forms of plants we analyzed the data with the Bayesian approach according to Weckerle et al. (2011). The Bayesian approach is especially suitable as we have a complete data set for the Swiss flora (Landolt, 2010) but rather incomplete data for the medicinal flora especially during the early historical periods (Weckerle et al., 2011; Leonti, et al. 2010).

As identification problems and ethno-taxa especially for early herbals (classical antiquity and monastic period) may influence the total number of medicinal plant species but much less so the total number of genera, we analyzed both, species and genera.

Results

Share of Swiss flora used as medicinal plants and its change over time

During the last two millennia, a total of 768 species (459 genera, 118 families) or 32 % (54 %, 79%) of the vascular plants of the Swiss flora have been documented and used as medicinal plants (Tab. 2.4). Figure 2.2 gives a detailed overview of the numbers of species and genera included or omitted during specific time periods.

Tab. 3.4 Share of Swiss flora (vascular plants) used as medicinal plants during different time periods (species/genera).

	Antiquity	Monastic medicine	Renaissance	Modern and contemporary era	Ethnobotanical studies	Total over all time periods
Share of Swiss flora used as medicinal plants	285/221	366/266	476/332	477/353	304/224	768/449
% of Swiss flora	12/26	16/27	20/39	20/42	13/26	32/54
Total number of medicinal plants	629/381	672/380	559/385	554/445	373/271	-

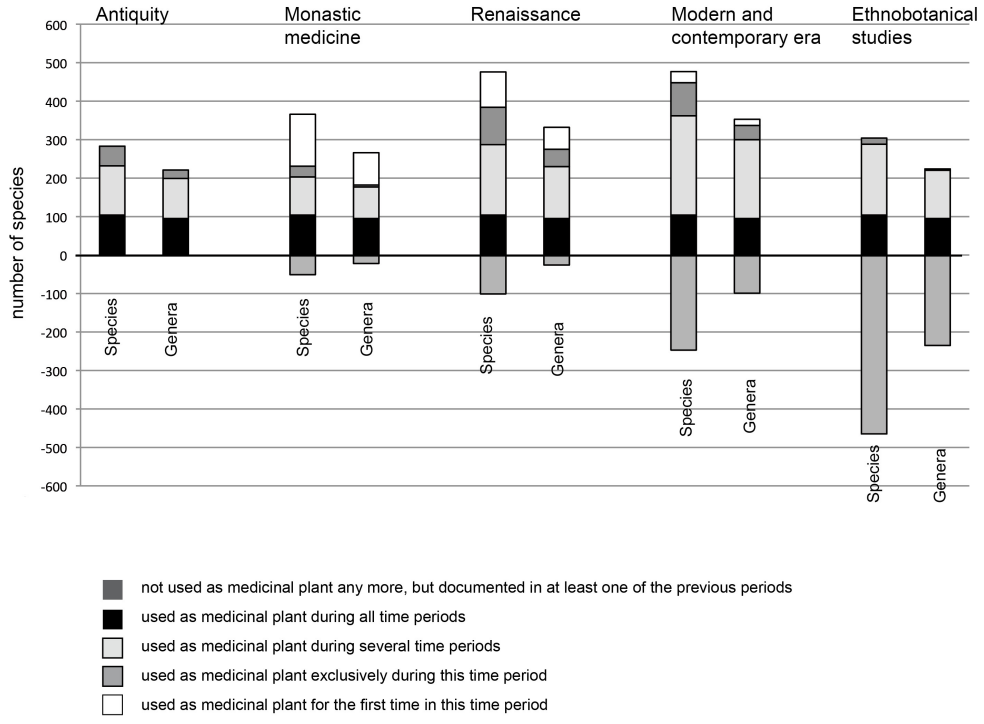

Fig. 3.2 Number of medicinal plant species and genera used during different time periods.

Overall, 104 species / 88 genera are documented through all time periods as well as in the recent ethnobotanical studies (Fig. 2.2, indicated in black; for the species list see Tab. 2.3). A high number of new medicinal species and genera were included in the codices and printed herbals during the monastic period and Renaissance between the 8th and 17th century (Fig. 2.2, indicated in white). However, of the totally 768 species, 292 and 465 do no longer occur in the contemporary literature and the recent ethnobotanical studies, respectively (Fig. 2.2, indicated in dark grey). Some of the medicinal plants are documented only during a specific time period (Fig. 2.2, indicated in grey; Tab. 2.4-8).

Totally 31 species documented from antiquity to contemporary are not documented in the ethnobotanical studies.

Tab. 2.5 The 104 species of the Swiss flora documented through all time periods.

Abies alba Mill.	*Coriandrum sativum* L.	*Linum usitatissimum* L. agg	*Pyrus communis* L.
Achillea millefolium L. agg.	*Corylus avellana* L.	*Malus sylvestris* Miller agg.	*Quercus robur* L. agg.
Acorus calamus L.	*Crocus sativus* L.	*Malva sylvestris* L. agg.	*Raphanus sativus* L.
Adiantum capillus-veneris L.	*Cucurbita pepo* L.	*Marrubium vulgare* L.	*Rosa canina* L. agg.
Agrimonia eupatoria L.	*Cydonia oblonga* Miller	*Matricaria chamomilla* L.	*Rubia tinctorum* L.
Allium cepa L.	*Daucus carota* L.	*Melissa officinalis* L.	*Rubus idaeus* L.
Allium sativum L.	*Eryngium campestre* L.	*Mentha pulegium* L.	*Rumex acetosa L. agg.*
Althaea officinalis L.	*Euphorbia esula* L. agg.	*Mentha spicata* L. agg.	*Ruta graveolens* L.
Anagallis arvensis L. agg.	*Ficus carica* L.	*Mercurialis annua* L.	*Salix alba* L. agg.
Anethum graveolens L.	*Foeniculum vulgare* Miller agg.	*Mercurialis perennis* L. agg.	*Sambucus ebulus* L.
Arctium lappa L. agg.	*Fumaria officinalis* L. agg.	*Meum athamanticum* Jacq.	*Sambucus nigra* L.
Artemisia abrotanum L.	*Gentiana lutea* L. agg.	*Morus nigra* L.	*Saponaria officinalis* L.
Artemisia absinthium L.	*Glycyrrhiza glabra* L.	*Nasturtium officinale* R. Br. agg.	*Secale cereale* L.
Arum maculatum L. agg.	*Hedera helix* L.	*Ocimum basilicum* L.	*Sinapis alba* L. agg.
Asarum europaeum L. agg.	*Heracleum sphondylium* L. agg.	*Onopordum acanthium* L.	*Solanum nigrum* L. agg.
Avena sativa L. agg.	*Hordeum vulgare* L. agg.	*Origanum vulgare* L. agg.	*Symphytum officinale* L. agg.
Beta vulgaris L.	*Hyoscyamus niger* L.	*Papaver somniferum* L.	*Thymus serpyllum* L. agg.
Cannabis sativa L.	*Hypericum perforatum* L. agg.	*Petasites hybridus* (L.) Gaertner et al.	*Thymus vulgaris* L.
Capsella bursa-pastoris (L.) Medikus agg.	*Inula helenium* L.	*Petroselinum crispum* (Mill.) Fuss	*Triticum aestivum* L. *agg.*
Carum carvi L.	*Iris germanica* L. agg.	*Pimpinella saxifraga* L. agg.	*Tussilago farfara* L.
Chelidonium majus L.	*Juglans regia* L.	*Polygonum aviculare* L. agg.	*Valeriana officinalis* L. agg.
Cichorium intybus L.	*Juniperus communis* L. agg.	*Polypodium vulgare* L. agg.	*Veratrum album* L. agg.
Clematis vitalba L.	*Juniperus sabina* L.	*Potentilla reptans* L.	*Verbascum thapsus* L. agg.
Colchicum autumnale L. agg.	*Larix decidua* Miller	*Prunus avium* L.	*Verbena officinalis* L.
Conium maculatum L.	*Lepidium sativum* L.	*Prunus domestica* L. *agg.*	*Vinca minor* L.
Convallaria majalis L.	*Levisticum officinale* W. D. J. Koch	*Prunus spinosa* L.	*Viola hirta* L. agg.
Coriandrum sativum L.	*Levisticum officinale* Koch	*Prunus spinosa* L.	*Vitis vinifera* L.

Tab. 3.6 The 51 species of the Swiss flora documented in Dioscorides' Materia Medica but not included in later herbals.

Adonis aestivalis L. agg.	*Equisetum fluviatile* L.	*Lysimachia punctata* L. *	*Rhamnus saxatilis* Jacq.
Aegilops ovata L. agg.	*Equisetum telmateia* Ehrh.	*Maianthemum bifolium* (L.) L.F. Schmidt	*Rumex aquaticus* L.
Allium sphaerocephalon L.	*Erythronium dens-canis* L.	*Morus alba* L.*	*Sedum cepaea* L.
Anthoxanthum odoratum L. agg. *	*Euphorbia chamaesyce* L. agg. *	*Neslia paniculata* (L.) Desv. agg.	*Seseli annuum* L. agg.
Asperugo procumbens L.	*Euphorbia characias* L. agg.	*Orchis papilionacea* L.	*Seseli libanotis* (L.) W.D.J. Koch
Aubrieta deltoidea (L.) DC*	*Euphorbia spinosa* L.	*Papaver hybridum* L. agg.	*Silene coronaria* (L.) Clariv.*
Avena fatua L. agg.	*Fumaria capreolata* L.*	*Phillyrea latifolia* L. agg.	*Sium latifolium* L.

Bunias erucago L.	*Glaucium corniculatum* (L.) Rudolph	*Polemonium caeruleum* L.*	*Sorghum halepense* (L.) Pers. *
Butomus umbellatus L.	*Helleborus orientalis* Lam.	*Polygonum persicaria* L.	*Tragopogon crocifolius* L.
Clinopodium vulgare L. agg.	*Hemerocallis fulva* (L.) L.	*Quercus ilex* L.*	*Trapa natans* L.
Daphne alpina L. agg.	*Holosteum umbellatum* L. agg.	*Ranunculus lanuginosus* L.	*Tribulus terrestris* L.
Doronicum pardalianches L.*	*Jasminum officinale* L. *	*Ranunculus muricatus* L.	*Vicia cracca* L. agg.
Duchesnea indica (Andrews) Focke*	*Lupinus angustifolius* L. agg.	*Reseda phyteuma* L.*	

* neophytes to the northern parts of Switzerland

Tab. 3.7 The 28 species of the Swiss flora documented exclusively in codices of the monastic medicine.

Acinos alpinus (L.) Moench.	*Aster linosyris* (L.) Bernh.	*Euonymus japonicus* Thunb.	*Plantago sempervirens* Crantz
Allium ascalonicum L.	*Carthamus lanatus* L.	*Euonymus latifolius* L. (Mill.)	*Ranunculus sardous* Crantz
Allium fistulosum L.	*Cornus alba* L. agg.	*Inula britannica* L.	*Rumex hydrolapathum* Huds.
Anemone blanda Schott & Kotschy	*Coronopus squamatus* (Forssk.) Asch.	*Juncus effusus* L. agg.	*Setaria viridis* (L.) P.Beauv. agg.
Aristolochia rotunda L.	*Cyclamen hederifolium* Aiton	*Laserpitium siler* L.	*Sisymbrium irio* L.
Asphodelus albus Mill. agg.	*Cyperus esculentus* L.	*Lathyrus cicera* L.	*Trifolium fragiferum* L.
Asplenium adiantum-nigrum L. agg.	*Daphne laureola* L.	*Nardus stricta* L.	*Viola alba* Besser agg.

Tab. 3.8 The 97 species of the Swiss flora documented exclusively in Renaissance herbals.

Allium oleraceum L. agg.	*Consolida regalis* Gray agg.	*Hypericum montanum* L.	*Potentilla verna* DC. agg.
Allium vineale L.	*Crepis biennis* L.	*Hypochaeris radicata* L.	*Primula halleri* J.F. Gmel
Alnus viridis (Chaix.) DC agg.	*Dactylorhiza maculata* (L.) Soo. agg.	*Juncus articulatus* L. agg.	*Pulicaria dysenterica* (L.) Bernh.
Anacamptis pyramidalis (L.) Rich.	*Dactylorhiza sambucina* (L.) Soo.	*Kickxia spuria* (L.) Dumort.	*Ranunculus arvensis* L.
Anchusa arvensis (L.) M. Bieb.	*Delphinium elatum* L. agg.	*Laburnum alpinum* (Mill.) Bercht & J.Presl. agg.	*Ranunculus auricomus* L. agg.
Anemone ranunculoides L.	*Descurainia sophia* (L.) Prantl.	*Lathyrus sylvestris* L. agg.	*Ranunculus repens* L.
Anthemis arvensis L. agg.	*Dianthus carthusianorum* L. agg.	*Lathyrus tuberosus* L.	*Reseda lutea* L.
Anthericum liliago L.	*Dianthus caryophyllus* L.	*Lepidium campestre* (L.) R. Br. agg.	*Reseda luteola* L.
Anthriscus sylvestris (L.) Hoffm. agg.	*Dianthus superbus* L. agg.	*Lepidium ruderale* L.	*Rhodiola rosea* L.
Arenaria serpyllifolia L. agg.	*Digitalis grandiflora* Mill.	*Leucanthemum vulgare* Lam. agg.	*Rorippa sylvestris* (L.) Besser agg.
Artemisia pontica L.	*Doronicum clusii* (All.) Tausch agg.	*Leucojum vernum* L.	*Salix repens* L. agg.

Aruncus dioicus (Walter) Fernald	*Echinops sphaerocephalus* L. agg.	*Lilium bulbiferum* L. agg.	*Scilla bifolia* L. agg.
Asperula arvensis L.	*Equisetum palustre* L.	*Listera ovata* (L.) R. Br.	*Sedum rupestre* L. agg.
Barbarea verna (Mill.) Asch. agg.	*Festuca pratensis* Huds. agg.	*Lupinus albus* L.	*Solanum melongena* L.
Berula erecta (Huds.) Coville	*Gagea lutea* (L.) Ker Gawl. agg.	*Medicago lupulina* L.	*Stellaria holostea* L.
Botrychium lunaria (L.) Sw.	*Galanthus nivalis* L. agg.	*Melampyrum arvense* L. agg.	*Stipa pennata* L. agg.
Buglossoides arvensis (L.) I. M. Johnst agg.	*Gentiana cruciata* L.	*Myricaria germanica* (L.) Desv.	*Teucrium botrys* L.
Bunium bulbocastanum L.	*Geranium dissectum* L.	*Nigella arvensis* L.	*Trigonella caerulea* (L.) Ser.
Bupleurum rotundifolium L. agg.	*Geranium pratense* L.	*Ophioglossum vulgatum* L.	*Typha latifolia* L. agg.
Calla palustris L.	*Geranium rotundifolium* L.	*Ophrys holosericea* (Burm. Fil.) Greuter agg.	*Valerianella locusta* (L.) Laterr. agg.
Calystegia sepium (L.) R. Br. agg.	*Gnaphalium uliginosum* L.	*Orchis mascula* (L.) L. agg.	*Verbascum blattaria* L.
Campanula trachelium L.	*Gymnadenia conopsea* (L.) R. Br. agg.	*Orchis militaris* L.	*Veronica agrestis* L. agg.
Centaurea montana L. agg.	*Hesperis matronalis* L. agg.	*Orchis ustulata* L. agg.	*Veronica austriaca* L. agg.
Chenopodium album L. agg.	*Hordeum murinum* L. agg	*Polygonum lapathifolium* L. agg.	*Veronica hederifolia* L. agg.
Chenopodium polyspermum L.	*Hypericum hirsutum* L.	*Potentilla alba* L.	*Vicia sepium* L. agg.
Chenopodium rubrum L. agg.			

Tab. 3.9 The 87 species of the Swiss flora documented exclusively in herbals of the modern and contemporary era.

Actaea spicata L.	*Echinacea purpurea* (L.) Moench	*Hottonia palustris* L.	*Potentilla recta* L. agg.
Agave americana L.	*Epilobium anagallidifolium* Lam.	*Hydrocotyle vulgaris* L.	*Prunus cerasifera* Ehrh.
Agrimonia procera Wallr.	*Epilobium angustifolium* L.	*Impatiens glandulifera* Royle	*Prunus padus* L. agg.
Ailanthus altissima (Mill.) Swingle	*Epilobium fleischeri* Hochst.	*Impatiens noli-tangere* L.	*Pulmonaria angustifolia* agg.
Althaea hirsuta L.	*Epilobium montanum* L. agg.	*Linaria alpina* (L.) Mill. agg.	*Pulsatilla pratensis* (L.) Mill. agg.
Antirrhinum majus L.	*Epilobium palustre* L.	*Linum catharticum* L. agg.	*Ranunculus glacialis* L.
Arctium tomentosum Mill.	*Epilobium parviflorum* Schreb.	*Lycium barbarum* L. agg.	*Ranunculus thora* L.
Asparagus tenuifolius Lam.	*Epilobium roseum* Schreb.	*Mahonia aquifolium* (Pursh.) Nutt	*Rosa pendulina* L.
Astragalus exscapus L.	*Erica carnea* L.	*Matricaria discoidea* Dc.	*Rumex alpinus* L.
Brassica juncea (L.) Czern.	*Erophila verna* (L.) DC. agg.	*Mimulus guttatus* DC.	*Rumex crispus* L. agg.
Bromus ramosus Huds. agg.	*Galeopsis tetrahit* L. agg.	*Monotropa hipopitys* L. agg.	*Salix daphnoides* Vill.
Bupleurum falcatum L. agg.	*Gentiana pannonica* Scop.	*Myosotis scorpioides* L. agg.	*Salix fragilis* L.
Centrantus ruber (L.) DC	*Gentiana punctata* L. agg.	*Narcissus pseudonarcissus*	*Salix viminalis* L.

agg.		L.	
Ceterach officinarum Willd.	*Globularia vulgaris* L. agg.	*Oenanthe pimpinelloides* L. agg	*Scleranthus annuus* L. agg.
Chenopodium ambrosioides L.	*Glycine max* (L.) Merr.	*Osmunda regalis* L.	*Solidago canadensis* L. agg.
Chimaphila umbellata (L.) W.P.C. Barton	*Gnaphalium sylvaticum* L. agg.	*Phragmites australis*	*Stachys palustris* L.
Chrysosplenium alternifolium L.	*Gratiola officinalis* L.	*Phytolacca americana* L.	*Stachys sylvatica* L.
Clematis recta L.	*Helianthemum nummularium* (L.) Mill. agg.	*Pinguicula vulgaris* L.	*Tanacetum balsamita* L.
Conyza canadensis (L.) Cronquist	*Helianthus annuus* L.	*Pinus mugo* Turra agg.	*Tanacetum cinerariifolium* (Trevir.) Sch. Bip.
Cymbalaria muralis P. Gaertn. & al.	*Helianthus tuberosus* L. agg.	*Plantago arenaria* Waldst. & Kit.	*Ulex europaeus* L.
Digitalis lanata Ehrh.	*Herniaria glabra* L.	*Polygala vulgaris* L.	*Viburnum opulus* L.
Drosera rotundifolia L.	*Herniaria hirsuta* L.	*Polygonum amphibium* L.	

Use patterns of the Swiss flora over time

Table 2.10 and 2.11 give an overview of over- and underrepresented medium (10-90 spp.) and large (>90 spp.) sized families in herbals of different time periods.

Tab. 3.10 Overrepresentation of medium (10-90 spp.) and large (>90 spp.) families of the Swiss flora in medicinal plant books over time. Overrepresented species / genera are highlighted.

	Swiss Flora		Antiquity		Monastic medicine		Renaissance		Modern and contemporary era		Ethnobotanical studies	
Amaryllidaceae	22 /	4	5 /	2	8 /	2	10 /	4	5 /	2	5 /	1
Apiaceae	89 /	50	23 /	21	29 /	25	32 /	28	29 /	26	21 /	20
Asparagaceae	21 /	12	6 /	6	6 /	5	7 /	7	7 /	4	2 /	2
Ericaceae	23 /	13	0 /	0	1 /	1	4 /	4	10 /	8	5 /	4
Euphorbiaceae	24 /	3	11 /	2	8 /	2	7 /	2	4 /	2	3 /	2
Iridaceae	10 /	4	4 /	3	4 /	3	5 /	3	2 /	2	2 /	2
Lamiaceae	71 /	30	13 /	11	28 /	22	34 /	22	36 /	24	26 /	20
Malvaceae	11 /	6	2 /	2	3 /	3	6 /	4	7 /	4	4 /	3
Oleaceae	11 /	7	4 /	4	4 /	3	2 /	2	4 /	3	3 /	2
Papaveraceae	16 /	6	8 /	4	6 /	5	6 /	5	5 /	4	4 /	4
Ranunculaceae	72 /	20	10 /	7	10 /	6	22 /	14	19 /	12	7 /	7
Rosaceae	107 /	28	17 /	11	24 /	14	30 /	15	35 /	17	27 /	15
Solanaceae	17 /	11	6 /	5	5 /	5	6 /	5	11 /	9	5 /	3

Tab. 3.11 Underrepresentation of medium (10-90 spp.) and large (>90 spp.) families of the Swiss flora in medicinal plant books over time. Underrepresented species / genera are highlighted.

	Swiss Flora		Antiquity		Monastic medicine		Renaissance		Modern and contemporary era		Ethnobotanical studies	
Campanulaceae	33 /	5	0 /	0	0 /	0	2 /	1	1 /	1	0 /	0
Caryophyllaceae	95 /	27	5 /	4	4 /	4	8 /	5	5 /	5	3 /	2
	117 /		1 /	1	3 /		1 /	1				0
Cyperaceae		17				1			0 /	0	0 /	
Juncaceae	28 /	2	0 /	0	1 /	1	1 /	1	0	2	0 /	0
	50 /		2 /		1 /	1	12 /	8				0
Orchidaceae		27		1					1 /	1	0 /	
Orobanchaceae	50 /	9	0 /	0	0 /	0	1 /	2	1 /	2	1 /	1
Plantaginaceae	58 /	19	0 /	0	6 /	2	14 /	5	15 /	6	9 /	4
Poaceae	162 /	71	12 /	10	12 /	12	11 /	10	11 /	11	7 /	7
	26 /			0	0 /	0	1 /	1				0
Saxifragaceae		3	0 /						2 /	2	0 /	

Over- and underrepresentation of indigenous plants, archeophytes and neophytes during the different time periods are shown in table 2.12. Among the archeophytes used for medicinal purposes through all time periods are many cultivated food plants, such as cereals, e.g., *Avena sativa*, *Hordeum vulgare*, *Secale cereale*, *Triticum aestivum*, fruits, e.g., *Cydonia oblonga*, *Prunus domestica*, vegetables, e.g., *Allium cepa*, *Allium sativum*, *Beta vulgaris*, *Brassica rapa*, *Cichorium intybus*, *Raphanus sativus* or spices, e.g., *Anethum graveolens*, *Levisticum officinale*, *Ocimum basilicum*, *Pimpinella anisum*, *Sinapis alba* and *Trigonella foenum graecum*. Other archeophytes are used as medicinal plants only, e.g., *Artemisia abrotanum, Conium maculatum, Marrubium vulgare* and *Verbena officinalis*. The category of archeophytes contains also medicinal plants which are indigenous to specific regions of Switzerland but are archeophytes to the rest of Switzerland such as *Arctium lappa, Capsella bursa-pastoris, Chelidonium majus, Foeniculum vulgare, Hyoscyamus niger, Inula helenium, Matricaria chamomilla, Pimpinella saxifraga* and *Thymus vulgaris*; and species that occurred after the last glacial period under anthropogenic influence, e.g., *Linum usitatissimum, Mentha spicata, Malus sylvestris, Prunus avium* and *Rosa canina.*

Tab. 3.12 Over- and underrepresentation of indigenous species, archeophytes and neophytes. Over- and underrepresented species are highlighted.

	Swiss Flora	Antiquity	Monastic medicine	Renaissance	Modern and contemporary era	Ethnobotanical studies
Indigenous	1447	108	161	222	248	167
Archaeophytes	367	111	138	159	122	82
Neophytes	539	66	67	95	107	55

Indigenous plants used for medicinal purposes through all time periods are, e.g., *Achillea millefolium, Agrimonia eupatoria, Asarum europaeum, Carum carvi, Clematis vitalba, Colchicum autumnale* agg.*, Gentiana lutea, Hedera helix, Hypericum perforatum* agg.*, Juniperus communis, Juniperus sabina, Mercurialis perennis, Nasturtium officinale, Origanum vulgare, Petasites hybridus, Prunus spinosa, Quercus robur, Rubus idaeus, Salix alba, Sambucus nigra, Thymus serpyllum* agg.*, Tussilago farfara, Verbascum thapsus* agg.*, Vinca minor* and *Viola hirta*.

Typical neophytes used since the modern era are *Aesculus hippocastanum, Echinacea purpurea, Oenothera biennis, Prunus laurocerasus, Robinia pseudoacacia* and *Thuja occidentalis.* Other species in this category are medicinal plants indigenous to a specific part of Switzerland but found in the whole area only after 1500 AD, such as *Convallaria majalis, Larix decidua, Malva sylvestris, Polygonum aviculare,* and *Symphytum officinale*. These species are documented in the herbals since antiquity.

Tab. 3.13 Over- and underrepresentation of different growth forms. Over- and underrepresented growth forms are highlighted.

	Swiss Flora	Antiquity	Monastic medicine	Renaissance	Modern and contemporary era	Ethnobotanical studies
geophytes	1617	157	211	312	299	195
herbs	448	74	75	99	76	39
trees	110	34	47	33	58	42
shrubs	178	20	33	32	44	28

Trees are overrepresented as medicinal plants since the monastic medicine (Tab. 2.13). The following trees are used since antiquity: *Castanea sativa*, *Juglans regia*, *Larix decidua*, *Malus* spp., *Quercus robur*, *Salix* spp., and *Sambucus nigra*. Conifers like *Abies alba*, *Picea abies*, and *Pinus* spp., which are abundant in the Alps, are mainly used as source of resins. The genus *Acer* is not preferred as medicinal plant and a medicinal use is only described for *Acer campestre* in the monastic period and Renaissance herbals.

Mountain plants are underused for medical purposes compared to their abundance, whereas weeds and ruderal plants are overrepresented from antiquity to Renaissance (Tab. 2.14).

Tab. 3.14 Over- and underrepresentation of ecological groups (habitats). Over- and underrepresented ecological groups are highlighted.

	Swiss Flora	Antiquity	Monastic medicine	Renaissance	Modern and contemporary era	Ethnobotanical studies
forest	337	41	70	68	96	62
mountain	288	5	13	15	22	14
pioneer plant	114	15	14	16	21	9
water	54	5	4	4	6	3
marsh	187	10	13	17	20	8
low fertile, dry meadow	135	13	20	27	17	13
weed, ruderal	414	75	101	118	98	60
fertile meadows	21	3	4	7	3	3
n.d.[1)]	803	145	137	205	192	131

[1)] Data are incomplete, as aggregates cannot be assigned to a specific ecological group.

Discussion

Medicinal plant species of the Swiss flora used over different time periods

The total share of the Swiss flora documented as medicinal plants over all time periods is with 32% (762 species) relatively high. The highest percentages of medicinal plants given by Schippmann et al. (2006) in a worldwide overview are 34.5% for the Republic of Korea and 30.3% for Pakistan. For European countries he mentions around 20%, e.g., 19.4% for France and 21% for Bulgaria. In North America 11.7% of the flora are used medicinally (Moerman et al., 1999). However, for the particular time periods the share in Switzerland is around the world average of 17.1% (Schippmann et al., 2006),

and ranges from a minimum of 11 % in the contemporary literature to a maximum of 20 % in the Renaissance.

Overall, the number of documented species steadily increased up to the Renaissance and is relatively constant since then. A reason for the increase was the necessity to find substitutes for Mediterranean or exotic species documented in antic herbals, as explicitly aimed for, e.g., in the Lorsch pharmacopoeia from the 8th century (Stoll, 1992). Usually, species were substituted with local species of the same genus, e.g., *Allium ursinum* and *Artemisia vulgaris* instead or in addition to other *Allium* and *Artemisia* species, or *Hypericum perforatum* instead of the Mediterranean *Hypericum olympicum*. Like this, the number of indigenous species and archeophytes steadily increased with only a moderate increase of genera. *Veronica* is an example of a newly included indigenous genus. In the 12th century Hildegard von Bingen described for the first time the use of *Veronica beccabunga*. Leonhardt Fuchs, in his herbal from 1543, documents 6 different species, *V. agrestis*, *V. austriaca*, *V. beccabunga*, *V. chamaedrys*, *V. hederifolia*, and *V. officinalis*. In the contemporary literature, only the use of *V. officinalis* is mentioned, but the use of *V*. *chamaedrys* and *V. beccabunga* is documented in ethnobotanical studies. Other well-known species, which were newly introduced in the monastic period are the Lamiaceae *Glechoma hederacea*, *Hyssopus officinalis*, *Lavandula angustifolia*, *Rosmarinus officinalis*, and *Salvia officinalis*, as well as the Asteraceae *Arnica montana*, and *Calendula officinalis.* Furthermore, in the 16th and 17th century, exotic species from the new world and the Far East were included in the herbals as new medicinal plants such as, e.g., *Capsicum annuum*, *Rheum rhabarbarum* and *Zea mays,* which leads to a high number of neophytes in Renaissance herbals.

However, a smaller part of the increase of species numbers may also be explained with identification problems of species mentioned in books from the antiquity and monastic medicine, as only since the Renaissance with its precisely illustrated herbals the species can easily be identified. For example, there still exist uncertainties about the identity of *Dauwurtz*, *Lilim*, *Sysemera* or *Wiszgras* in Hildegard von Bingen's Physica, and such species do thus not occur in our statistics (Mayer-Nicolai, 2009).

Also in contemporary herbals newly introduced medicinal plants can be found, such as the neophytes *Echinacea* spp. Other species which are mentioned for the first time as medicinal are exclusively used as Bach-Flowers: *Bromus ramosus*, *Impatiens glandulifera*, *Hottonia palustris*, *Mimulus guttatus*, *Prunus cerasifera*, *Scleranthus annuus*, and *Ulex europaeus*; or are ingredients of anthroposophic remedies: *Astragalus exscapus, Senecio cineraria*, *Salix viminalis* and *Nicotiana tabacum.* Others are *Arnica chamissonis* as substitute for *Arnica montana*, and *Solidago canadensis*, an invasive neophyte as substitute for *Solidago virgaurea*.

A comparison of the different time periods reveals a consensus on 104 species and 95 genera. Many of these species were also documented in archeobotanical sites in Switzerland and have a use history lasting for at least 3000 years (Jacquat, 1989). In Hauterive-Champréveyres, for example, with excavations dating from Late Bronze Age (1050 – 880 BC) the use of *Achillea millefolium, Agrimonia eupatoria, Arctium lappa, Capsella bursa-pastoris, Crataegus laevigata, Filipendula ulmaria, Lamium album, Mentha aquatica, Sambucus nigra* and *Verbena officinalis* most probably as medicinal plants has been documented (Jacquat, 1989).

Overall, the high number of formerly documented medicinal plants, which do not occur in the literature any longer (247 spp.) do provide a rich source for ethnopharmacological and medicinal studies and eventually the development of new herbal remedies. Various recent studies focus on these sources, such as Adams et al. (2009, 2011 and 2012), who searched historical herbals from the Renaissance for specific use-categories such as rheumatic disorders, malaria and epilepsy, or Lardos et al. (2011), who focused on Byzanthine Iatrosophia texts from Cyprus.

A comparison of the recent ethnobotanical studies with earlier literature shows that 124 of 304 species are already mentioned by Dioscorides, 81 species are documented since the monastic period, 54 since the Renaissance herbals, and 29 since the modern era. But, 465 formerly documented spp. do not occur in the ethnobotanical studies and thus seem not to be used any more. A total of 16 species, most of them probably local subsitutes, are exclusively documented in the ethnobotanical studies: *Achillea nana*, *Artemisia umbelliformis*, *Athyrium filix-femina*, *Briza media*, *Buphthalmum salicifolium*, *Erysimum cheiranthoides*, *Geranium sylvaticum*, *Geum montanum*, *Polygonum viviparum*, *Sambucus racemosa*, *Sempervivum montanum*, *Silene vulgaris*, *Sorbus aria*, *Valeriana montana*, *Viola calcarata* and *Viola canina*.

Use patterns of the Swiss flora over time

In the different time periods, various plant families are over- or underrepresented in the analysed herbals. Interestingly, intensive use of specific families is mainly found in the antiquity (8 families overrepresented), the modern era (7) and the contemporary period (5). Although relatively high overall numbers of species are used during the monastic medicine and the Renaissance, only four families are overrepresented each, which indicates a less focused use of the flora. Typical medicinal plant families such as the Lamiaceae and Apiaceae are overrepresented through almost all periods and the number of species used is constantly high. A broad use of these two families as medicine is also known from other regions of the Holarctic flora such as North America, Korea, Kashmir and the Chiapas Highland (Moerman et al. 1999). However, Asteraceae, which rank highest among the

overused families in Moerman et al.'s study, are not overrepresented in any of the time periods in our analysis.

The use of families with typically toxic species generally decreases after the Renaissance. Euphorbiaceae and Papaveraceae are among the toxic families which are overrepresented during antiquity and the monastic medicine and Ranunculaceae during the Renaissance and modern era. To avoid intoxication, many of the toxic plants are no longer used as herbal medicine, but may be prepared as homeopathic preparations. In the case of Ranunculaceae, *Adonis vernalis* is among the few species, which are still mentioned in the contemporary herbals, whereas the genera *Aconitum*, *Actaea*, *Anemone*, *Aquilegia*, *Clematis*, *Helleborus*, *Hepatica*, *Nigella*, *Pulsatilla*, and *Ranunculus* are only found in earlier literature.

The underrepresentation of Cyperaceae and Poaceae through all time periods and Orchidaceae through all periods beside the Renaissance again corresponds with findings from other holarctic floras (Moerman et al., 1999; Weckerle et al., 2012).

Archeophytes are overrepresented in herbals from all time periods and obviously constitute an important source of medicinal plants. The ecological groups of weeds and ruderal species are overrepresented from antiquity to Renaissance, but not any more since the modern era. Weeds and ruderal plants are known to be preferentially used as medicine (Stepp and Moerman, 2001). Not surprisingly, indigenous species are underrepresented from antiquity to Renaissance because of a general focus on Mediterranean species. Interestingly, mountain plants, i.e. plants from above the timberline, are underrepresented through all time periods while trees and forest plants are overrepresented since the monastic medicine. Only relatively few tree species dominate the Swiss forests. They are the result of strong anthropogenic selection since times of early settlement (ca. 5500 BC; Gobet et al., 2010). On the one hand forests were partially cleared for agroforestry systems and on the other hand particular trees were fostered for economic, religious or ceremonial reasons (Stuber and Bürgi, 2011). Generally, trees played an important role in ritual and magical ceremonies in Celtic cultures (Le Roux and Guyonvarc'h, 1996), which is documented in Switzerland for example for the Grisons (Caminada, 2006). Also magical health rituals to captivate demons in trees were widely practiced in alpine regions (Mannhardt, 1963). The overuse of trees for medicinal purposes is probably due to both, a specific cultural focus on trees and the fact that only relatively few but salient species are available.

Conclusions

A constant body of medicinal plant knowledge in Switzerland exists since ancient time. This knowledge was always influenced by knowledge from neighboring countries and no "typical Swiss specialties" seem to exist. An increase of medicinal plant species from antiquity to Renaissance can be observed with a relatively stable and high number of species since then. Medicinal plants are not randomly chosen from the available flora. Certain species are deliberately introduced others are neglected. This process, which is still ongoing, can be traced back with the help of herbals to the antiquity. Thus, regarding the medicinal plants of the Swiss flora, the terms "tradition / traditional" can mean more than two millennia or just a few decades.

Supplemental Material: see Appendix

Table: Swiss plants documented in historical and contemporary herbals

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CHAPTER 4

HOW DID MEDICINAL PLANT USE CHANGE OVER TIME? A DIACHRONIC STUDY OVER TWO MILLENNIA IN SWITZERLAND.[6]

with Reinhard Saller, Marco Leonti and Caroline S. Weckerle[7]

Abstract

Medicinal plant knowledge in Switzerland can be traced back from present to antiquity. About 100 medicinal plant species and ethnotaxa are continuously documented two millennia back through history. While some species underwent dramatic changes in use, application and preparation others show at present the same uses as in antiquity or monastic medicine. Drivers for these shifts and changes can be found in the evolution of medicinal concepts (e.g., humoralpathology vs. evidence based medicine), changing environmental conditions, history of epidemiology, legal framework and economic reasons.

Based on a broad selection of historical, popular and scientific herbals relevant for Switzerland we investigate how the specific uses of medicinal plant changed over time. We elucidate use patterns (e.g., indications, preparations, applications, plant part used).

Our research documents several trends: a general extension of use categories, continuity in use for 56 spp. in 12.6% of all cases (129 cases), and scientific evidence for 53 spp. in 13.8% of all cases (110 cases). Maximal share of constant plants can be found for dermatological (DER) and gastrointestinal (GAS) indications (29%, 38 spp., resp. 27%, 41 spp.). A decrease in importance for from antiquity to present is found in antidots (14 spp. in antiquity to 2 spp. in contemporary era), while the interest in medicinal plants for cardiovascular disorders increased in recent popular herbals (22 spp. in contemporary era, 5 spp. in Antiquity and 11 spp. in Renaissance). Another general shift is detected in application form from topical use toward systemic use (ratio systemic to topic in Antiquity 52:45% and in contemporary era 71:27%) and plant part used with a recent focus on flowers instead of fruit and seeds in antiquity.

Overall the general pattern is an increase in variety of use categories from antiquity to renaissance. The present folk medicinal herbals still reflect this variety whereas evidence based literature and legal frameworks (e.g., ESCOP / EMA monographs) document only a small sector of present and historical uses.

[6] Mansucript ready to submit

[7] Research design: MDC, CSW, ML, RS; Data compilation: MDC, ML; Statistical analysis: MDC, CSW; Writing: MDC, CSW.

Introduction

The constant body of medicinal plant knowledge in Middle Europe, that can be traced back the last two millennia to the roots of written tradition, was shaped by both, the available flora and the preference for specific taxa (Tobyn et al., 2011; Dal Cero et al., 2014). While climatic and ecological factors did not change dramatically over this time period, the arrival of neophytes after the 15thcentury from the Americas and later Australia had a large impact on the available medicinal flora. However, the available flora is only one of the key elements shaping medicinal plant use (e.g., Smith-Hall et al., 2012). Like all human skills, the preparation and use of medicine is inextricably linked with the cultural, socio-economic, political and historical environment (e.g., health care options, policies and legislation, economics, religion). With respect to the constant body of medicinal plant knowledge in Middle Europe, we assume that epidemiological pressure, changes of philosophical, scientific and medicinal theories, key medical findings and historical events shaped the use of medicinal plants at large (Fig. 4.1).

The history of medicinal tradition is well documented since Antiquity and changes in the prevailing medical philosophy can be identified (Porter, 1997; Eckhart et al., 2008; Ackerknecht, 1970). Over almost two millennia the prevailing concept was the correspondence of microcosm and macrocosm, originating in ancient Greek philosophy around 5th century BC (Rothschuh, 1962). It formed the basis of humoral pathology and its theory of four humours and as a systematic (or in modern terms "holistic") approach to life provided a coherent cosmology revealing complex relationships between men and other organisms. Through Galen's (ca. 131-201 AD) elaborate writings humoral pathology came into blossom and remained the prevailing medical concept until the early 18th century (Porter, 1997). During medieval times the written knowledge of ancient medicine was conserved in Christian monasteries. Old codices were newly compiled and the Mediterranean Materia Medica substituted with local species (Stoll, 1992). Antic predilections such as "diet over drugs" (Porter, 1997; Touwaide, 2015; Totelin, 2015) can be found in monastic medicine, e.g., in Hildegard von Bingen's (1098-1179 AD) Physica where she describes healthy qualities of food plants (Portmann, 1991). Beside the conservation of ancient knowledge and practice in monasteries, Christian ethos and charity added new aspects to medicine and were one of the drivers for establishing hospitals in Middle Europe (Porter, 1997).

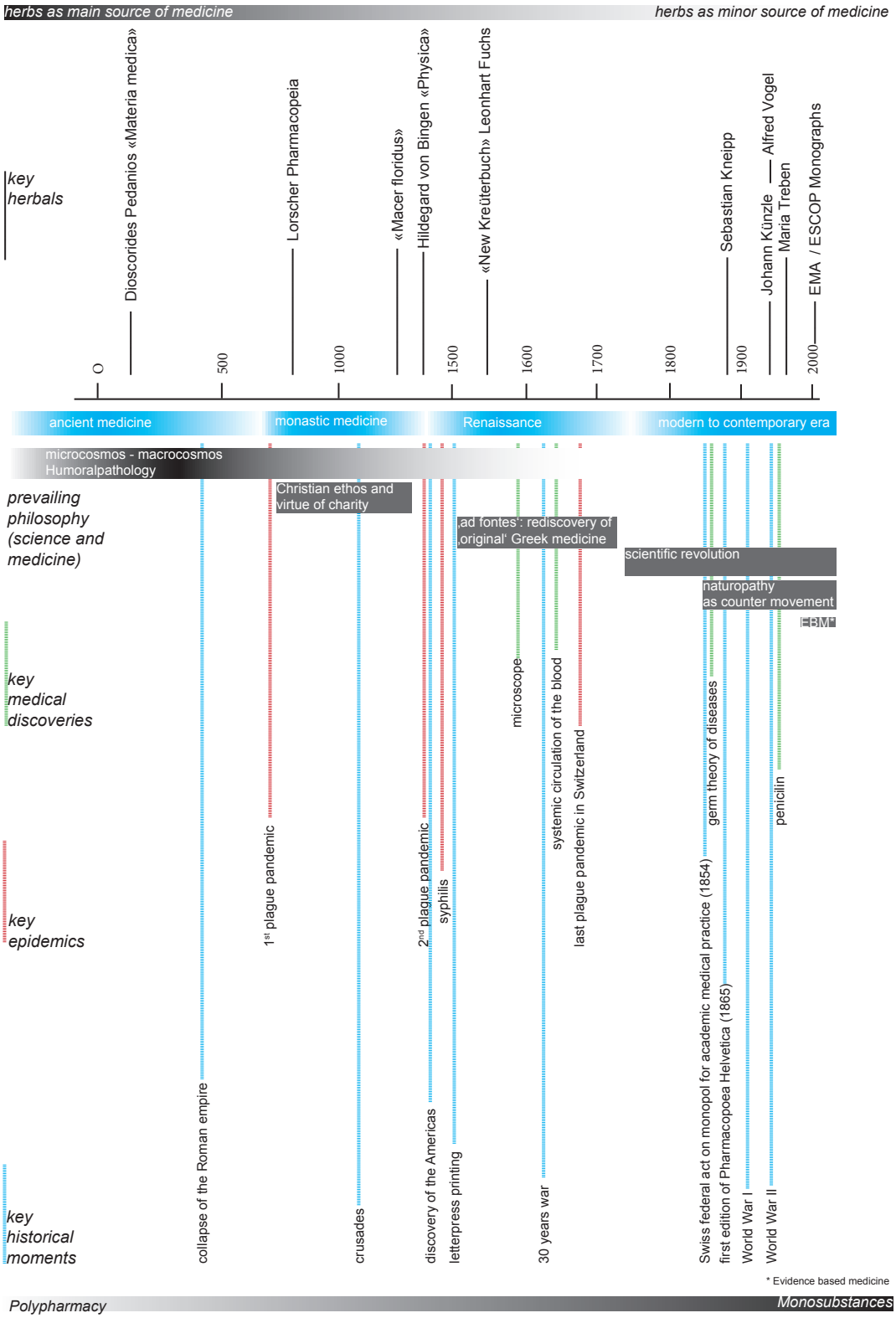

Fig. 4.1 Synchronoptic overview of key drivers influencing medicinal plant use.

The Renaissance era tried to go back to the ancient roots of knowledge and wanted to clear off all Arabic influence in translated medical texts (Porter, 1997; Bruchhausen & Schott, 2008). In parallel the detachment from ancient medical authorities and Christian ethos began. The enlightenment movement marked the beginning of modern time and was paralleled by a scientific revolution resulting in new ideas and theories replacing ancient concepts. Finally, in the 19th century evolutionary theory began to influence the scientific world view. In parallel, the reliance on medicinal herbs as main source for remedies began to decrease and polypharmacy (multi target drugs) was largely replaced by mono substances, which became available due to new scientific methods and discoveries (Lederman, 2001; Gertsch, 2011).

Since antiquity a great diversity characterized the medicinal landscape of the old world. Written and institutionalized medicine existed along various forms of oral traditions which finally resulted in todays' Middle European medical pluralism (Glaser, 2006; Bruchhausen & Schott, 2008; Hoefert & Uehleke, 2009; Jenny & Sharma, 2009). Different fields of the medicinal landscape evolved and changed through time. Parallel to the scientific revolution leading to biomedicine a countermovement arose in the late 18th century, the (health) political movement of naturopathy (Roth, 1991; Wolff, 2008). It laid out the ground for what we may subsume as complementary and alternative medicine today. It is in these fields of the medicinal landscape where the antic ideas of humours and balance still exist in a mitigated form, as so-called constitutional factors: if the body is robust, illness should not result. Another example is the still wide spread idea of 'blood cleansing' and general detoxifying strategies in Swiss popular medicine (Glaser, 2006; Dal Cero et al., 2015).

Different types of historical studies on medicinal plant use exist. Ancient herbals may be used to search for historical plant use against specific diseases or as source of information which may lead to drug discovery (Adams et al., 2007, 2009, 2011a, 2011b). Historical ethnobotanical studies are also interested in trends of knowledge transmission such as the influence of ancient herbals on recent medicinal plant use, e.g., Dioscorides ex Matthioli 1st century AD ex 1568 (Leonti et al., 2010), Tabernaemontanus 17th century (Clair, 2011), Hildegard von Bingen 12th century (Mayer-Nicolai, 2009; Uehleke, 2012), Iatrosophia texts in Cyprus (Lardos et al., 2011 and 2013), Corpus Hippocraticum 5th century BC (Touwaide, 2015; Toteling, 2015), and several Western pharmacopeias (De Vos, 2010).

In this paper we aim to provide a diachronic insight into use patterns of ca. 100 medicinal plant taxa used over the last two millennia in Switzerland. We specifically analyse how uses and applications of plants and plant parts changed over different time periods and discuss these changes against the backdrop of the above outlined historical context.

Methods

This study is based on the 104 plant species from the Swiss flora which were shown to be continually used as medicine during the last two millennia (Dal Cero et al., 2014). For several species we use the species complexes (aggregates, agg.) as defined in the 'Flora indicativa' (Landolt, 2010). These aggregates comprise closely related Swiss and Alpine species and thus tend to reflect so-called ethnotaxa, i.e. species used interchangeably for the same purpose. The following adjustments were made with respect to Dal Cero et al. (2014): we added *Helleborus* spp., *Peucedanum* spp., *Teucrium* spp., *Salvia* spp. and *Urtica* spp. as ethnotaxa as these genera have been used since Antiquity with small changes in the species used (local substitutes). In addition, we merged the following species into ethnotaxa as they are used interchangeably: *Abies alba* and *Larix decidua* (*Abies* spp.), *Lepidium officinale* and *Nasturtium officinale* (*Lepidium* spp.), *Mercurialis annua* and *M. perennis* (*Mercurialis* spp.), *Prunus avium*, *P. domesticum* and *P. spinosa* (*Prunus* spp.), *Sambucus nigra* and *Sambucus ebulus* (*Sambucus* spp.), *Sinapis alba* and *Brassica nigra* (*Sinapis* spp.), as well as *Solanum nigrum* and *Solanum dulcamara* (*Solanum* spp.). Finally we skipped *Glycyrrhizza glabra* as this species is only mentioned in the 'Flora indicativa' (Landolt, 2010) but not in the 'Flora Helvetica' and therefore does not belong to the Swiss flora *sensu stricto* (Lauber and Wagner, 2012). In total, we analysed 102 taxa (species, aggregates and ethnotaxa; cf. Appendix). Accordingly, we use the term 'plant taxa' instead of 'plant species' in the following text. Nomenclature follows the 'Plantlist' (the plantlist 1.1), family names the APG system (Stevens, 2001 onwards).

We based our analysis of use categories on the same selection of written documents as in Dal Cero et al. (2014; see table 1 therein). After consulting all 24 herbals we selected 14 sources, which all contribute to the consensus of the 102 species per time period and give detailed information about medical uses. We omitted those herbals, which did not add new uses (Flück, 1941; Leclerc, 1922; Weiss, 1985; Saller et al., 1995) or did not give detailed information about the medical use of single species (index of Capitulare de villis [Strank and Meurers-Balke, 2008] and index of Lonicero [Lonicero, 1679]), and we did not consider homeopathy (Madaus, 1938), anthroposophic medicine (Schramm, 1997) and Bach flowers (Scheffer, 1981).

Modern and contemporary herbals are separated into popular herbals (folk medicinal practices and personal experience) and scientific herbals (Wichtl, 2008; ESCOP; EMA Monographs). These three sources serve as indicators of scientific evidence for efficacy and safety of the medicinal herbs. In total we analysed 16 written sources as shown in table 1.

Tab. 4.1. Books used for the analysis of use categories

Time Period	**Book title** «short title», (title of English translation)	**Author**	**First Edition / Edition used**	**Abbreviation**
Antiquity 1st century CE	Materia medica	Dioscorides Pedanios from Anazarbos	1st century CE / Berendes (1902)	DIOS[1)]
Monastic medicine 8th – 12th century	Lorscher Pharmacopoeia	Anonymus	8th century / Stoll (1992)	LO
	«Macer floridus»	Odo Magdunensis	ca. 1100 / Mayer and Goehl (2001)	MF
	«Physica»	Hildegard von Bingen	ca. 1151 Portmann (1991)	HvB
Renaissance 16th – 17th century	«New Kreüterbuch»	Leonhart Fuchs	1543 / Dobat and Dressendörfer (2001)	LF
	«Neuw Kreuterbuch»	Tabernaemontanus; Jacob Theodor	1588 / Edition anno 1625	TAB [2)]
Modern to contemporary era since 19th century	Popular herbals[3)]			
	So sollt ihr leben (Thus Shalt Thou Live)	Sebastian Kneipp	1889 / Kneipp (2010)	KN
	Das grosse Kräuterheilbuch	Johann Künzle	1945 / Künzle (1945)	JK
	Der kleine Doktor	Alfred Vogel	1952 / Vogel (1952)	AV
	Phytotherapie: Traitement des Maladies par les Plantes	Jean Valnet	1983 / Valnet (1992)	VAL
	Gesundheit aus der Apotheke Gottes	Maria Treben	1980 / Treben (2011)	MT
	Natürlich gesund mit Heilpflanzen	Bruno Vonarburg	1988 / Vonarburg (1988)	BVA
	Praxis-Lehrbuch der	Ursel Bühring	2005 /	UB

	modernen Heilpflanzenkunde		Bühring (2005)	
	Scentific herbals			
	Teedrogen und Phytopharmaka	Max Wichtl (ed.)	1984 / Wichtl (2008)	WI
	ESCOP Monographs and supplement	European Scientific Cooperative of Phytotherapy	2003 and 2009	ESCOP
	EMA Monographs	Committee on Herbal Medicinal Products (HMPC)	Webpages 1995 – 2015/ accessed oct. 2014	EMA

[1)] We used the modern translation of Dioscorides' Materia medica from Berendes (1902) as surrogate of earlier Dioscorides translations. We crosschecked for ethnotaxa with Matthioli (1568) as one of the most wide spread Renaissance translations of Dioscorides' Materia medica (Leonti et al. 2010).

[2)] For those species not found in Leonhart Fuchs (*Acorus calamus, Malus sylvestris,* and *Pyrus communis*) we consulted the herbal of Tabernaemontanus (1625).

[3)] These popular herbals reflect the knowledge sources of todays herbalists in Switzerland (cf. Dal Cero et al., 2015).

For the analysis each documentation of a particular part of a specific plant for a specific use in a time period was recorded as one use report (UR). The plant parts were categorized following Dal Cero et al. (2015) into 'subterranean parts' (roots, rhizomes, bulbs), 'leaves', 'flowers' (including floral buds), 'herba' (aerial parts of flowering plants), 'fruits' (pericarp with or without seeds) and 'seeds' (including seed-like fruits such as achenes and caryopsis). The category 'combinations' includes 'planta tota' (subterranean and aerial parts) and all combinations of two or more plant parts. The category 'var' includes ashes, bark, essential oil, resin, sap and wood.

Routes of administration were grouped into systemic (i.e. oral intake and suppository), topical (i.e. ointments, cataplasm, gargle) and volatile applications (i.e. inhalation, smoke and steam bath). All uses were grouped into 18 use categories related to organs, symptoms and route of administration (Tab. 4.2). The categories are basically following Leonti et al. (2010) and Dal Cero et al. (2015). For matching historical uses with our modern use categories we consulted Hoefler (1899).

Tab. 4.2. Use categories related to organs and symptoms

Abbreviation	Organ / symptom	Notes
ANT	antidot	bites and stings of poisonous and mad animals, intoxication
APH	aphrodisiac	and anaphrodisiac
APO	apotropaic	against 'bad influence' and ailments [no internal use], charms
CAR	cardiovascular	blood circulation, heart diseases, systemic applications for

		haemorrhoids and veins
DER	dermatological	skin, wounds, ulcers, topic applications for haemorrhoids and veins
EAR	ear	ear infections, deafness
EYE	ophthalmic	eye infections, blindness
FEV	fever	including malaria
GAS	gastrointestinal	digestion, stomach ache, diarrhoea, icterus
GYN	gynaecological	menstrual problems, perinatal
HUM[1)]	humoral detoxification	general indication for purification and detoxification
NER	nerves	sleeplessness, nervousness, general analgesics
RES	respiratory	cough, lungs
SKE	skeletomuscular	musculoskeletal pain and disability, rheumatism, injuries
TEE	teeth	teeth ache
TON[2)]	tonic	general strengthening, immunomodulatory, roborants, anaemia
URO	urological	bladder, kidney disease
VAR	varia	including anti-inflammatory, blood, cancer, diabetes, diet, metabolic disorders, parasites, spleen

[1)] 'humoral detoxification' is used only for general detoxifying indications without a link to diuretic (->URO) or laxative effects (->GAS), mainly for 'removing of bad humours' (blood, choler, phlegm) in the sense of the ancient theory of the four humours and humoral pathology.

[2)] 'tonic' is used in a strict sense and all indications with a link to appetite and digestion (e.g. orexygenic) are allocated in GAS, indications with link to fatigue or nervous exhaustion are allocated in NER.

To describe diachronic changes of species per use category and use categories per species, respectively, we used descriptive statistics (mean ± standard deviation).

To compare different time periods analyses of variance (ANOVA) was used after square root transformation of the target variable according to the first aid transformation of Tukey (Stahel, 2002). A one-way ANOVA was applied on the normally distributed data and followed by a *post hoc* test for multiple comparisons (Games–Howell test for variables with significantly different variances) to determine pairwise differences among the time periods. The significance level α for all tests was 0.05. R-package 3.2.2 (R Core Team, 2015) was used for the statistical analysis.

Results

Use reports per time period and diachronic changes in use categories

Totally 4263 use reports (UR) were recorded for the102 medicinal plant taxa with the following distribution over time periods: Antiquity 891 UR, monastic medicine 681 UR, Renaissance 1036 UR, modern to contemporary era 1285 UR in popular herbals, and 366 UR for 53 taxa in scientific herbals. Average UR per species is significantly lower in the monastic period compared to all other periods, but does not differ between Antiquity, Renaissance and modern to contemporary era. Also, average number of plant taxa per use category does not differ significantly between different time periods, but is significantly lower in scientific herbals (Fig. 2).

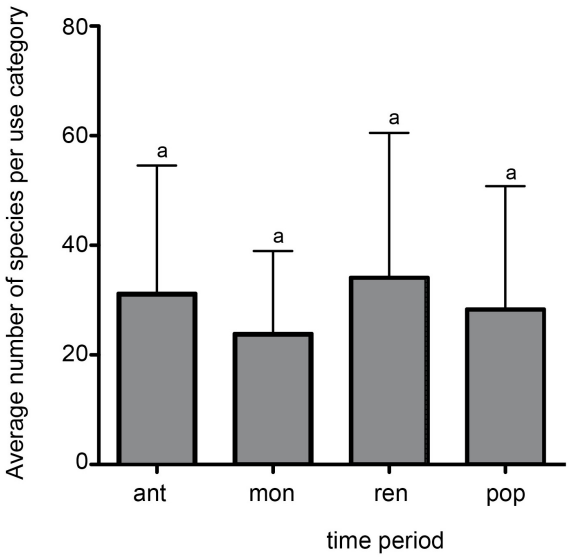

Figure 4.2 Average number of species per use category in different time periods. Means sharing the superscript letter (a) are not significantly different from each other and thus can be grouped together ($p < 0.05$).

ant=antiquity, mon=monastic medicine, ren=renaissance, pop=popular herbals, sci=scientific herbals

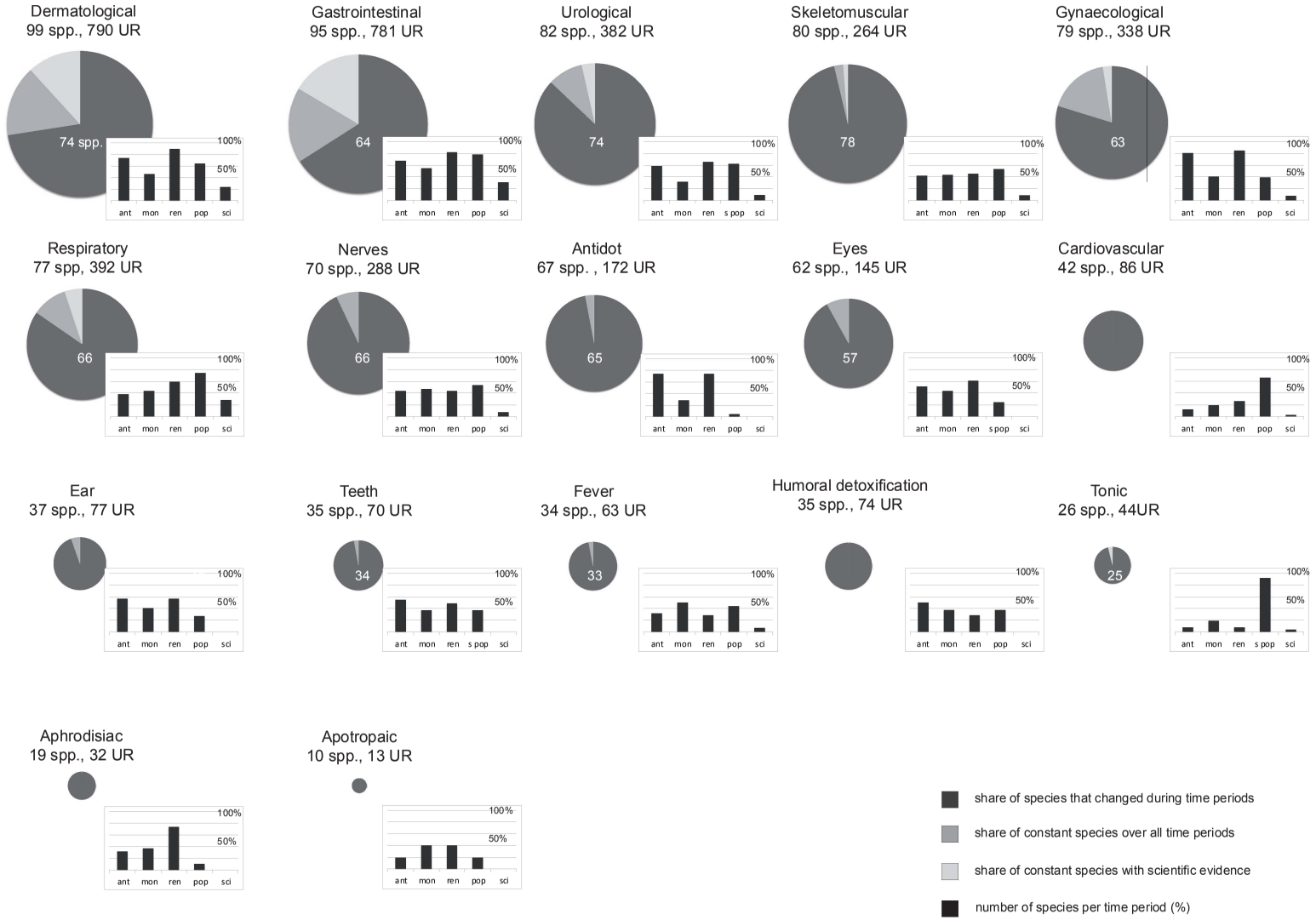

Fig. 4.3.
Number of taxa used in a specific use category over all time periods (pie charts), and percentage of taxa per use category used in different time periods (bar charts).

Focussing on use categories, highest numbers of taxa constantly used during all time periods are found in GAS (33 taxa), DER (27), GYN (16), RES (12), and URO (11). However, for all categories most of the plant taxa used changed during time periods and the share of constantly used taxa ranges between 0-29% (Fig. 4.3, pie charts). For the categories GAS and DER with the highest share of constantly used taxa also the highest percentage of permanently used taxa with scientific evidence is found (GAS: 9%, 12 taxa; DER: 8%, 16 taxa). Overall, shares of taxa with scientific evidence are high for GAS (36%), RES (30%), and DER (27%) but between 0-7% for all other categories (Fig. 4.3, bar charts). A steady increase over time periods in taxa diversity is shown for RES, CAR and TON (Fig. 4.3, bar charts). Cardiovascular uses appear with a large diversity (28 taxa) in modern and contemporary herbals (from 5 taxa in Antiquity, to 8 in monastic medicine and 11 in Renaissance), but no specific taxa was used through all time periods. Also the category tonic appears mainly in popular herbals (22 taxa; e.g., *Avena sativa, Origanum vulgare, Thymus vulgaris, Urtica dioica*) whereas in Antiquity only *Artemisia absinthium* and *Ficus carica* were considered as general tonics. The concept of antidots was important until Renaissance with 14 documented taxa since Antiquity, whereas in contemporary herbals this indication is documented only for *Allium sativum* and *Ruta graveolens*.

Frequency change of applications

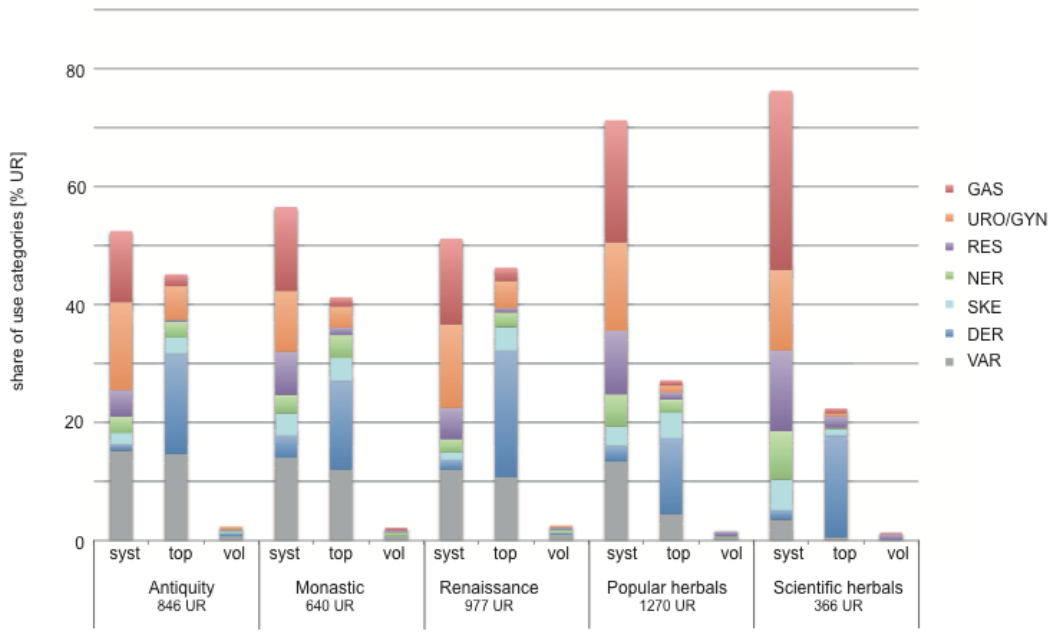

Fig. 4.4. Systemic, topical and volatile applications in different time periods (n_{UR}=4099).

The preference for systemic applications over topic applications increased in the modern and contemporary era (Fig. 4.4). The ration between systemic and topic changed from 52% to 45% (444 UR_{sys} to 382 UR_{top}) in Antiquity to 71% to 27% (911 UR_{sys} to 346 UR_{top}) in modern to contemporary era and 76% to 22% (279 UR_{sys} to 82 UR_{top}) in scientific herbals. Application of volatile substances as smokes, inhalation and steam bath played a minor role in all time periods.

At the level of use categories we observe a relative increase for systemic applications for GAS from 12% (102 UR_{sys}) in antiquity to 20% (263 UR_{sys}) in popular herbals and 30% (111 UR_{sys}) in scientific herbals, for RES from 4% (38 UR_{sys}) in antiquity to 11% (137 UR_{sys}) in popular herbals and 14% (50 UR_{sys}) in scientific herbals, and for NER from 3% (24 UR_{sys}) in antiquity to 5% (69 UR_{sys}) in popular herbals and 8% (30 UR_{sys}) in scientific herbals.

For dermatological problems topical applications were preferred through all eras with an average of 16.1% ± 2.9 (787 UR_{tot} for DER with 677 UR_{top}).

Preferences for plant parts in different time periods

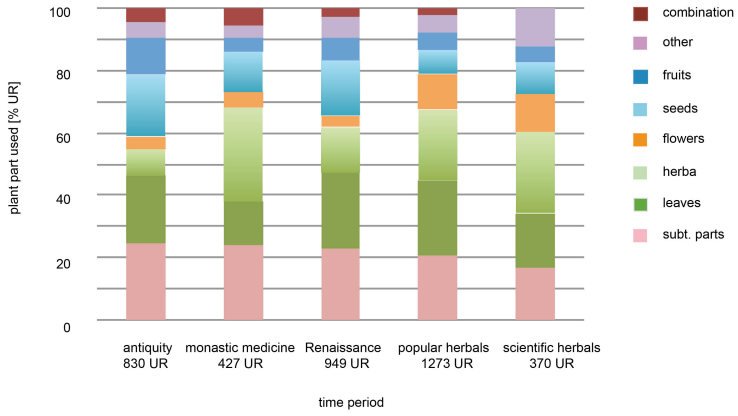

Fig. 4.5. Plant parts used in different time periods (n_{UR}=3849).

Leaves and subterrestrial parts constitute similar shares over the time periods observed (Fig. 4.5). While flowers play a more important role in modern medicinal plant use compared to earlier times (from 4% to 11.5%), the use of fruits and seeds decreased since Renaissance (from 32%, 164 UR_{seed} and 100 UR_{fruit} in Antiquity to 14%, 98 UR_{seed} and 73 UR_{fruit} in contemporary time). The share of seeds is in all time periods higher than fruits. Some typical seeds and seed-like fruits used trough all time

periods are *Carum carvi, Coriandrum sativum*, *Foeniculum vulgare, Sinapis nigra,* and *Urtica dioica.* In other taxa the seeds were used in Antiquity but today leaves are preferred, e.g., *Artemisia abrotanum* and *Capsella bursa-pastoris.*

'Herba' shows a relative increase from 8.5% (71 UR_{herba}) in Antiquity to 22.6% (288 UR_{herba}) in contemporary popular herbals with a peak of 30% (129 UR_{herba}) in monastic medicine. Combinations play a minor role at any time with 3% (37 UR_{comb}) to 5.5% (29 UR_{comb}).

Shifts in the use of plant families

Apiaceae, Asteraceae, Lamiaceae and Rosacese have been shown elsewhere to be preferred medicinal plant families in Switzerland (cf. Dal Cero et al. 2014, Table 10). Use patterns over time of species and ethnotaxa of those families are shown in Fig. 4.6.

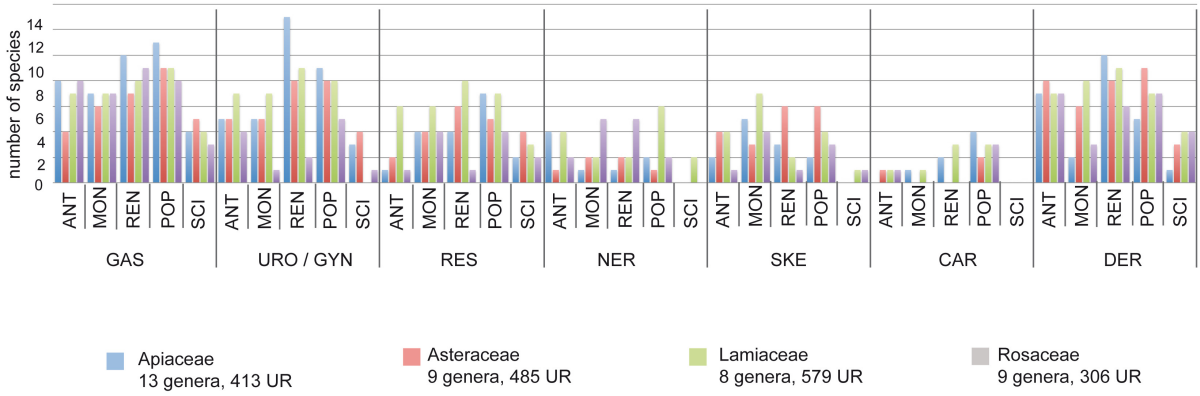

Fig. 4.6. Use patterns of Apiaceae, Asteraceae, Lamiaceae and Rosacese over different time periods (ANT = Antiquity, MON = monastic medicine, REN = Renaissance, POP = modern and contemporary popular herbals, SCI = modern and contemporary scientific herbals). CAR=Cardiovascular, DER=Dermatological, GAS=Gastrointestinal, GYN=Gynaecological, NER=Nerves, RES=Respiratory, SKE=Skeletomuscular, URO=Urological.

Species from Apiaceae, Asteraceae, Lamiaceae and Rosacese are equally used for gastrointestinal disorders. In Renaissance Apiaceae are remarkably popular for urological and gynaecological as well as dermatological uses. For nerves Lamiaceae are preferred in modern and contemporary popular herbals, whereas in monastic medicine and Renaissance Rosacea were preferred for this category.

Shifts in the use of species and ethnotaxa

Some of the analysed species were constantly used for the same indication and in addition show scientific evidence, while others have a more changeful use history. Table 4.3 gives an overview of

documented use categories per species and the stability of uses. In total, there are 1026 cases (4125 UR) of 1872 maximal possible cases for which a specific plant is documented for a specific use category, indicated in different shades of grey. In 129 cases (12.6%; 1427 UR_{const}; 56 taxa) uses for a specific species remained constant since Antiquity to contemporary time (black boxes). For 31.8 % of these cases (41 cases, 160 UR_{sci}) exists scientific evidence, e.g. *Achillea millefolium* for DER, *Allium sativum* for RES, *Artemisia absinthium* for GAS, *Foeniculum vulgare* for GAS and GYN or *Urtica dioica* for SKE (Tab. 4.3). The following species show high numbers of UR in the categories that remained stable since Antiquity: *Urtica dioica* (112 UR, 6 UC_{stab}), *Ruta graveolens* (88 UR, 8 UC_{stab}), *Artemisia absinthium* (74 UR, 6 UC_{stab}), *Matricaria chamomilla* (74 UR, 5 UC_{stab}), *Allium sativum* (62 UR, 5 UC_{stab}), *Mentha spicata* (58 UR, 2 UC_{stab}), *Thymus* spp. (57 UR, 5 UC_{stab}) and *Rosa* spp. (56 UR, 5 UC_{stab}).

In contrast, in 145 cases (14.1%; 288 UR_{new}; 31 taxa) new uses are documented for the first time in modern to contemporary popular herbals (medium grey boxes). For 11.3 % of these cases (16 cases, 45 UR_{sci}) exists scientific evidence. The following species show relatively high numbers of UR in new use categories in modern and contemporary era: *Achillea millefolium* (41 UR, 7 UC_{new}), *Valeriana officinalis* (26 UR, 3 UC_{new}), *Sambucus nigra* (20 UR, 4 UC_{new}), *Salix alba* (19 UR, 3 UC_{new}) and *Hypericum perforatum* (13 UR, 3 UC_{new}). The use categories with most species documented in modern and contemporary era are CAR (23 spp.), TON (20 spp.), NER (17 spp.), SKE (17 spp.), RES (16 spp.) and URO (13 spp.).

In 745 cases (30.9%; 2410 UR_{var}) uses for a specific taxon were documented in one or several time periods but without continuity (light grey boxes). Scientific evidence is documented for 99 cases (10.8 %%; 366 UR_{sci}). The average number of total use categories per species over all time periods is 10.1 ± 2.9. But per time period the average number of use categories per species is smaller, namely 5.2 ± 2.2 and varies from 11.3 ± 1.3 (*Ruta graveolens*) with totally 14 use categories over all eras to 1.0 ± 0.0 (*Colchicum autumnale*) with totally 2 use categories over all eras. Other species with a broad use are for example: *Artemisia absinthium* (11.0 ± 2.2, total 16 UC), *Allium sativum* (10.5 ± 2.5, total 17 UC), *Allium cepa* (9.8 ± 2.5, total 15 UC), *Urtica dioica* (9.3 ± 1.3, total 11 UC) and *Rosa* spp. (9.3 ± 2.6, total 16 UC).

Only a small spectrum of uses is found for, e.g., *Clematis vitalba* (2.3 ± 1.3, total 7 UC over all eras), *Cannabis sativa (*2.3 ± 1.9, total 6 UC), *Conium maculatum* (2.3 ± 1.9, total 7 UC), *Onopordum acanthium* (2.3 ± 2.9, total 8 UC), *Pyrus communis* (2.0 ± 1.2, total 6 UC), *Euphorbia esula* (1.8 ± 1.0, total 5 UC), and *Secale cereale* (1.3 ± 0.6, total 3 UC).

A third group of 15 species (390 UR) are those with various uses over the centuries, without a constant use and without any new uses in modern to contemporary era (highlighted in light grey in

Tab. 3), e.g. *Polygonum aviculare* (37 UR, 9 UC), *Hedera helix* (35 UR, 10 UC), *Cucurbita pepo* (32 UR, 8 UC), *Hordeum vulgare* (32 UR, 8 UC), *Ocimum basilicum* (29 UR, 12 UC).

Most species (87 spp., 2410 UR) show a mixed pattern with single use categories constantly documented, scattered new uses in modern to contemporary era and several uses that changed during history.

Tab. 4.3 Use categories per species documented over all eras (highlighted in black) and documented in modern and contemporary time only (highlighted in light grey). X indicates scientific evidence for specific uses.

	use categories per species per era [mean]	Standard deviation	min per era	max per era	ANT	APH	APO	CAR	DER	EAR	EYE	FEV	GAS	GYN	HUM	NER	RES	SKE	TEE	TON	URO	VAR	Use report total
Abies spp.	6.0	2.5	4	9																			38
Achillea millefolium agg.	3.8	3.6	1	9					X				X	X									79
Acorus calamus L.	4.3	2.5	1	7					x				X										31
Adiantum capillus-veneris L.	4.3	3.2	1	7																			21
Agrimonia eupatoria L.	4.5	3.2	3	9					X				X				X						34
Allium cepa L.	9.8	2.5	7	13																			72
Allium sativum L.	10.5	2.5	8	14				X									X	X					107
Althaea officinalis L.	7.0	1.8	5	9					X				X	X			X						61
Anagallis arvensis agg.	5.3	3.0	1	6																			22
Anethum graveolens L.	5.5	1.7	4	7																			30
Arctium lappa agg.	3.0	1.0	2	4					X												X		22
Artemisia abrotanum L.	7.5	2.5	4	10																			37
Artemisia absinthium L.	11.0	2.2	9	14									X										104
Arum maculatum agg.	3.0	1.2	2	4																			22
Asarum europaeum agg.	5.0	3.4	1	9																			25
Avena sativa agg.	4.8	4.2	2	11					X														35
Beta vulgaris L.	5.0	2.7	1	7																			23
Cannabis sativa L.	2.3	1.9	1	5																			12
Capsella bursa-pastoris agg.	3.5	2.5	1	7					X					X									36
Carum carvi L.	3.3	2.6	1	7									X										33
Chelidonium majus L.	4.5	2.4	3	8									X										32
Cichorium intybus L.	5.0	2.2	2	7									X										35
Clematis vitalba L.	2.3	1.3	1	4																			9
Colchicum autumnale agg.	1.0	0.0	1	1																			5
Conium maculatum L.	2.3	1.9	1	5																			11
Convallaria spp.	2.5	1.7	1	5																			13
Coriandrum sativum L.	2.8	1.5	1	4									X										19
Corylus avellana L.	3.0	1.4	2	5																			14
Crocus sativus L.	4.5	4.0	1	8																			23
Cucurbita pepo L.	3.8	2.2	1	6																	X		*32*
Cydonia oblonga Mill.	4.2	2.2	2	5																			29
Daucus carota L.	4.8	3.0	1	8																			35
Eryngium campestre L.	4.0	2.9	1	7																			19
Euphorbia esula agg.	1.8	1.0	1	3																			12

	use categories per species per era [mean]	Standard deviation	min per era	max per era	ANT	APH	APO	CAR	DER	EAR	EYE	FEV	GAS	GYN	HUM	NER	RES	SKE	TEE	TON	URO	VAR	Use report total
Ficus carica L.	7.3 ±	4.5	2	11																			66
Foeniculum vulgare agg.	7.0 ±	2.5	5	10									X	X			X						78
Fumaria officinalis agg.	2.8 ±	1.3	1	4																			25
Gentiana lutea agg.	4.0 ±	2.3	2	6									X							X			33
Hedera helix L.	6.0 ±	4.1	1	9													X						35
Helleborus spp.	6.0 ±	4.2	1	10																			32
Heracleum sphondylium agg.	5.3 ±	3.1	1	8																			25
Hordeum vulgare agg.	3.8 ±	2.5	1	7																			32
Hyoscyamus niger L.	8.0 ±	1.8	6	10																			41
Hypericum perforatum agg.	3.6 ±	3.1	1	8					X				X			X							68
Inula helenium L.	5.8 ±	1.6	4	7																			30
Iris germanica agg.	7.5 ±	1.5	1	11																			55
Juglans regia L.	5.3 ±	1.9	4	8					X														49
Juniperus communis agg.	6.3 ±	2.2	3	8									X					X					70
Juniperus sabina L.	2.8 ±	1.0	2	4																			23
Lepidium spp.	7.5 ±	3.0	5	11																			53
Levisticum officinale L.	5.8 ±	1.7	4	8																	X		41
Linum usitatissimum agg.	4.0 ±	2.0	1	5					X				X										40
Malus sylvestris agg.	6.2 ±	2.5	1	7																			25
Malva sylvestris agg.	8.0 ±	2.0	7	11									X				x						71
Marrubium vulgare L.	6.8 ±	1.0	6	8									X				X						63
Matricaria chamomilla L.	7.8 ±	2.5	5	11					X				X	X			X						100
Melissa officinalis L.	7.8 ±	0.5	7	8					X				X			X							78
Mentha pulegium L.	8.0 ±	1.0	2	11																			48
Mentha spicata agg.	8.3 ±	0.5	8	9					X				X					X					97
Mercurialis spp.	2.5 ±	2.1	1	5																			11
Meum athamanticum Jacq.	3.3 ±	1.0	1	5																			18
Morus nigra L.	3.5 ±	1.0	2	5																			23
Ocimum basilicum L.	5.5 ±	3.5	2	8																			29
Onopordum acanthium L.	2.3 ±	2.9	1	6																			11
Origanum vulgare agg.	7.3 ±	5.3	1	11																			45
Papaver somniferum L.	7.0 ±	0.6	3	9																			49
Petasites hybridus (L.) P. Gaertn. et al.	4.5 ±	4.1	1	9																			35
Petroselinum crispum (Mill.) Fuss	4.3 ±	1.0	4	5									X								X	X	31
Peucedanum spp.	8.3 ±	1.5	6	10																			52
Pimpinella saxifraga agg.	3.0 ±	2.3	1	5													X						21
Polygonum aviculare agg.	5.0 ±	3.6	1	8																			37

	use categories per species per era [mean]		Standard deviation	min per era	max per era	ANT	APH	APO	CAR	DER	EAR	EYE	FEV	GAS	GYN	HUM	NER	RES	SKE	TEE	TON	URO	VAR	Use report total
Polypodium vulgare L.	2.8	±	1.3	3	9									X				X						17
Potentilla spp.	5.8	±	2.8	3	9					X				X										48
Prunus spp.	4.5	±	1.5	2	8																			38
Pyrus communis agg.	2.0	±	1.2	1	3																			10
Quercus robur agg.	4.0	±	2.2	1	6					X				X										38
Raphanus sativus L.	5.3	±	3.3	2	9																			36
Rosa spp.	9.3	±	2.6	7	13					X								X	X				X	93
Rubia tinctorum L.	4.3	±	3.2	1	7																			20
Rubus idaeus L.	3.3	±	2.1	1	5					X				X	X									23
Rumx spp.	6.3	±	2.2	4	7																			41
Ruta graveolens L.	11.5	±	1.3	10	13																			115
Salix alba agg.	4.8	±	2.5	1	6								X					x		X				53
Salvia officinalis agg.	8.0	±	2.9	4	11					X			X	X										86
Sambucus nigra L.	6.8	±	2.9	3	10									X				X				X		69
Saponaria officinalis L.	5.8	±	2.6	3	8													X						35
Secale cereale	1.3	±	0.6	1	2																			6
Sinapis spp.	7.5	±	4.2	2	12													X					X	50
Solanum spp.	4.5	±	1.0	4	6					X														24
Symphytum officinale agg.	3.3	±	2.2	1	6					X				X					X					45
Teucrium spp.	5.0	±	4.2	1	9																			31
Thymus spp.	8.8	±	1.3	7	9					X								X						102
Triticum aestivum agg.	4.0	±	2.0	1	7																			36
Tussilago farfara L.	2.6	±	2.2	1	6													X						32
Urtica dioica L.	9.3	±	1.3	8	11					X									X			X		138
Valeriana officinalis agg.	4.8	±	3.3	1	9												X							50
Veratrum album agg.	4.8	±	3.8	2	10																			24
Verbascum thapsus agg.	5.5	±	2.5	2	8													X						43
Verbena officinalis L.	6.8	±	2.1	6	11													X						62
Vinca minor L.	3.0	±	1.7	1	4																			18
Viola hirta agg.	6.8	±	2.5	4	10					X														57
Vitis vinifera agg.	5.8	±	3.3	1	8					X														39
Total	**5.2**	±	**2.2**	1	14	69	17	10	42	99	35	62	36	95	78	35	70	77	80	35	26	80	75	41.7 ±26.4

The following general trends in the diachronic development of single species can be detected and highlighted with the following 6 examples: 1) relatively few use categories documented through

several time periods but many new categories in modern and contemporary era: *Achillea millefolium* (1 UC_{stab}, 26 UR; 7 $UC_{new,}$ 41 UR); 2) most use categories are documented in one or several time periods: *Allium sativum* (17 UC_{tot}, 107 UR); 3) most use categories remained stable over all / several time periods and no new uses are documented in modern and contemporary era: *Ruta graveolens* (17 UC_{tot}, 107 UR); 4) no stable use categories during the time periods but a new category in modern and contemporary era with scientific evidence: *Valeriana officinalis* (0 UC_{stab}; 3 $UC_{new,}$ 26 UR; 11 UC_{tot}, 50 UR_{tot}); 5) many use categories remained stable over all time periods and there exists also scientific evidence: *Matricaria chamomilla* (5 $UC_{stab,}$ 74 UR_{stab}; 26 UR for scientific evidence) ; 6) a shift in the plant parts used: *Sambucus* spp. (in Antiquity, Monastic medicine and Renaissance 0 UR for flowers; in popular and scientific herbals 21 UR for flowers).

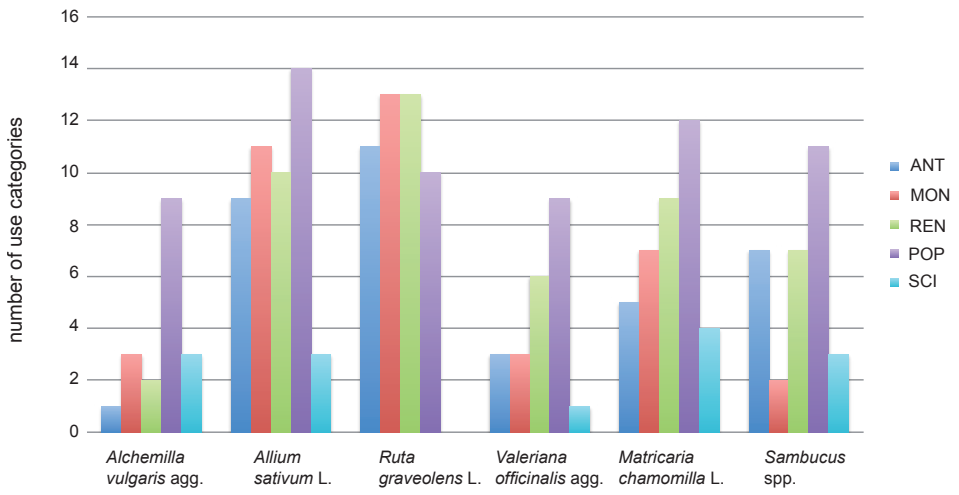

Fig. 4.7. Number of use categories for 6 examples during different eras representing general trends in diachronic development

Achillea millefolium was broadly used with a total of 11 use categories over all time periods. But only dermatological use (26 UR; 79 UR_{tot}) is stable since antiquity including science evidence today. Whereas in modern time 7 new use categories (CAR, GAS, RES, SKE, TEE, TON, URO; 41 UR) were

documented for the first time in popular herbals (cf. Tab. 3 and Appendix). Gynaecological use is documented since Renaissance with science evidence today.

The use of *Allium sativum* is solely documented for 17 use categories (i.e. all except FEV), from which ANT, DER, GAS, RES (62 UR; 107 UR_{tot}) remained stable over time and for RES (10UR) exists scientific evidence. In modern time SKE is added in popular and scientific herbals with 1 UR each.

Matricaria chamomilla has to be understood as an ethnotaxa in Antiquity and monastic medicine, i.e. genus *Anthemis* could also be included. Nevertheless *Matricaria chamomilla* serves as good example for a species with high scientific evidence in the uses that remain stable over time, namely DER, GAS and GYN (58 UR; 100 UR_{tot}). And also for the use category RES documented in modern popular herbals (4 UR) exists scientific evidence.

Ruta graveolens is an example for a species with a very constant use over time. Eight out of 14 categories in total remained stable, including ANT, DER, EAR, EYE, GAS, GYN, NER, RES (88 UR; 115 UR_{tot}). But for no use exists scientific evidence. Furthermore no new categories came up in modern and contemporary era.

Sambucus spp. (*Sambucus nigra* and *Sambucus ebulus*) was broadly used with the only constant use for DER (6 UR; 63 UR_{tot}). The use for RES (13 UR) came up in modern and scientific herbals and is associated with a change in plant part used to a new preference of flowers. In Antiquity, monastic medicine and Renaissance leaves (12 UR), subterrestrial parts (6 UR) and fruits (5 UR) were used whereas in modern time flowers (21 UR) and fruits (13 UR) were preferred, leaves and subt. parts play a minor role with 2 UR each. Scientific evidence is documented for flowers (RES) and fruits (RES, URO and GAS).

Valeriana officinalis was with 11 UC quite broadly used but there is no constant use in a specific category over time. In contemporary popular herbals 4 new categories are brought up (CAR, GAS, NER and RES) with 26 UR (50 UR_{tot}). Mainly subt. parts are used with one exception for the whole plant (subt. parts, leaves and flowers) in modern time.

Discussion

Major basic changes in medicinal theory, and the mitigated reliance on medicinal herbs lead in the last 150 years from polypharmacy remedies to preference of pharmaceutical monosubstances. Despite this thighter circumstances for medicinal herbs, our overview shows, that > 12% of historical uses are documented through all time periods from antiquity to contemporary time. As textual information can be accepted as reflecting actual practice (Touwaide & Appetiti, 2015), we ascertain, that this share of medicinal plant knowledge is continuously transmitted and practiced.

For Italy Leonti et al. found that 20% of actual uses of medicinal plants in four Italian regions are grounded in the written tradition of Dioscorides Materia Medica and casual dependence is shown (Leonti, 2010). The most influential written source on modern medicinal plant use in Mediterranean area seems Dioscorides' Materia medica, whereas the 500 years older Hippocratic corpus and other early texts have only an indirect impact by influencing and shaping Dioscorides and Galens writings (e.g. Totelin, 2009; 2015; Pollio, 2008; Lardos 2013; Leonti, 2015). As Middle European medicinal plant also bases on the same ancient textual heritage also for this parts of Europe the strong influence of Dioscurides Materia medica is obvious (Arber, 1953).

For the later period from monastic medicine to Renaissance and modern time exists also evidence, that for example Hildegard von Bingens claims for medicinal plants are more than 'lucky strikes' compared to actual uses (Uehleke, 2012).

For more than 50% of the species of our selection exists scientific evidence (i.e. efficacy and safety) for a specific use. This share corresponds with the > 50% of species from Swiss Flora that have been studied phytochemically (Adams et al., 2013). So, for all medicinal plants that have been used through all time periods at least main constituent of their phytochemical architecture is known.

Changes in medicinal concepts can be detected in the general shifts of use categories. The most important use categories regarding plant diversity, share of constantly used species and scientific evidence are DER=dermatological and GAS=gastrointestinal and figure prominently also in neighbouring Mediterranean medicinal floras (Lardos, 2010; Leonti, 2010) as well as in extra European medicinal floras (e.g. Southamerican: Monigatti et al., 2012, Southwest China: Weckerle et al., 2006; Vanuatu: Bradacs et al., 2011). And for this two use categories the share of species with scientific evidence is also relatively high. So we can conclude, that independently of medicinal concept there is a broad consensus on medicinal plant use for gastrointestinal and dermatological disorders.

By focussing on the change of medicinal concepts we analysed also ‚small use categories' related directly to historical development, e.g. ANT=antidote, APO=apotropaic and HUM=humoral

detoxification that played as use categories a role in older herbals. And we included also 'new' categories that figure prominently in modern and contemporary herbals as CAR=cardiovascular and TON=tonic. The cardiovascular category gained importance mainly in modern popular herbals – whereas the very popular Garlic in this category probably underlies a feedback loop in knowledge transmission (see below) and some of the plants do not influence directly heart activity but rather reduce stress that leads to cardiovascular problems (e.g. *Melissa officinalis, Rosa* spp.). Furthermore among use categories a certain overlap in the two concepts HUM and TON seems obvious as the general definition of a 'tonic', namely to restore and maintain the physiological functioning of an organ system (Götti et al, 2014), corresponds with the broad definition of humoral detoxification in the theory of the four humors (Porter, 1997). Plants that support digestion or have a diuretic effect may occur in both categories as e.g. *Artemisia absinthium* and *Urtica dioica*.

The broad use of many species in the diachronic overview probably reflects a certain experimental approach towards medicinal plant use. According to new needs or because of new theoretical considerations (e.g. concept of general anti-inflammatory or spasmolytic effect) plants were used in new use categories through time. An interesting change can be detected in modern and contemporary era when medicinal plants for cardiovascular issues became more prominent. This use category became important as such through anatomic understanding of systematic circulation of blood in the 17th century. In earlier herbals the category CAR was scarcely citet (cf. Lardos, 2010) but today CAR is prominent in popular herbals as cardiovascular diseases belong to the most abundant causes of death in Switzerland and Middle Europe (BFS, 2015).

We selected six examples of medicinal plants to highlight some general trends in discussions of todays' use of medicinal plants.

Allium sativum is the example with the most use categories documented through all time periods (17 out of 18 UC). In antiquity *Allium sativum* was considered medicinal plant as well as food plant and is therefore a typical example for the continuum between food and medicine (Totelin, 2015). This might be one of the reasons for the very broad use of Garlic. A second reason for the extension of uses can be found in the so called feedback loop when new pharmacological and clinical discoveries on cardiotonic and antiatherosclerotic propertis of garlic in the early 20th century appeared subsequently in popular herbals (Leonti, 2010). The phenomena of feedback loop and mutual impact of scientific discoveries and local popular knowledge can also be assumed for *Valeriana officinalis* and its prominent contemporary use as 'nervinum' (i.e. neurotonic) (Hager, 1910; Holste, 1916; Abascal & Yarnell, 2004) The todays prominent use of *Valeriana officinalis* as sedativum seems to be known since late middle ages (Stoll, 1992) but did not gain broad acceptance in written tradition, until pharmaceutical studies in late 19th century approved this use (Anagnostou, 2011).

The history of use of *Ruta graveolens* in Mediterranean area (i.e. its core area of distribution) is broad and impressive. Oldest uses in written tradition in Hippocratic corpus are mainly gynaecological and respiratory in later herbals also dermatological and swelling of spleen (Pollio, 2008). This ancient uses are still present and practiced in Mediterranean area (Lardos, 2010; Leonti, 2010). In Middle Europe *Ruta graveolens* grows only cultivated in gardens and is still described in popular herbals. But for example for Switzerland there is low evidence for practical use in actual ethnobotanical surveys (Dal Cero et al., 2015; Poncet, 2005; Broquet, 2006; Brühschweiler, 2008; Poretti, 2011; Wegmann, 2013). *Ruta graveolens* therefor could represent more a relict of Mediterranean heritage without being fully arrived in Middle European medicinal practice.

Elder flowers and berries (*Sambucus nigra*) ranke among the most important plants for wild collecting (Wegmann, 2014, Abbet et al. 2014, Grasser et al., 2012) as herbal tea and sirup (flowers) and jam and sirup (fruits). Elder flowers and berries again are considered on the food medicine continuum as healthy and recreating drink but also specifically used against colds and fever. Scientific monographs on *Sambucus nigra* also focus on flowers for their diuretic and antipyretic effect and on fruits (Ulbricht, 2014). From antiquity to Renaissance flowers are not documented as plant part used but leaves were preferred in topical applications for dermatological issues and for internal use as well as subt. parts for their diuretic and detoxifying properties. As the use of elder leaves is not documented in contemporary popular herbals (Vonarburg, 1988; Bühring, 2005) we could assume that the flowers substituted leaves for their diuretic effect, for dermatological issues other medicinal plants like e.g., *Calendula officinalis* or *Matricaria chamomilla* are preferred today.

Matricaria chamomilla and *Achillea millefolium* are two very popular medicinal herbs in modern to contemporary time. *Matricaria chamomilla* is by far the most used medicinal plant (systemic and topical uses) among laypeople and experts (Kummer, 1953; Dal Cero, 2015) and at the same time one of the very profoundly studied medicinal plant in phytopharmacological and clinical studies (McKay & Blumberg, 2006; Gardnier, P. 2007). For the use through all time periods in dermatological, gastrointestinal, gynaecological and respiratory issues exists scientific evidence. *Achillea millefolium* is among the medicinal plants with a broad expansion of uses in modern and contemporary popular herbals. The only constant use is documented for topical and systemic applications for wounds. But today for *Achillea millefolium* exists scientific evidence beside dermatological uses also for gastrointestinal (i.e. loss of appetite, spasmodic gastrointestinal complaints) and gynaecological (i.e. minor spasms) uses. Again we find here this expansion of uses during history that presumably indicates an intensive exchange of knowledge among different subcultures in medicinal landscape.

Conclusions

The diachronic insight into medicinal plant use covering the two millennia of written knowledge transfer highlights shift and changes in specific uses, plant parts and application forms according to the basic changes in medicinal concept, pharmaceutical technologies and new needs. Most medicinal plants show a general extension of uses during historical development and a general tendency for internal instead of topical uses could be detected. But also a constant body of specific uses for certain medicinal plants could be identified. This plants are used today in the same ways as in antiquity, monastic medicine and Renaissance regardless of basic changes in medicinal concepts and technological development.

The actual awareness in popular and scientific medicine for its heritage leads to a broad use of the term 'tradition' / 'traditional'. Nevertheless this terms need a more specific definition reflecting the shifts and changes in specific use of medicinal plants over long periods of time.

Acknowledgments

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Supplemental Material: see Appendix

Table: Use categories in different time periods

Table: Historical sources for 6 species

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CHAPTER 5

PUBLIC OUTREACH

5.1 Heilpflanzen in der medizinischen Landschaft der Schweiz [1]

In den verschiedensten Bereichen der medizinischen Landschaft der Schweiz werden Heilpflanzen verwendet: ein Kräutertee aus dem eigenen Garten, pflanzliche Heilmittel aus Apotheke und Drogerie, empfohlen beim Heilpraktiker oder verschrieben durch die Hausärztin.
Eine laufende ethnobotanische Studie am Institut für Systematische Botanik der Universität Zürich unter dem Titel „Kräuterkundige in der deutschsprachigen Schweiz" soll einen Überblick verschaffen zur aktuellen Situation zur Anwendung von Heilpflanzen. Anhand von Experten-Interviews mit kräuterkundigen Menschen werden bevorzugte Pflanzenauswahl sowie aktuelle Arbeitsweisen dokumentiert. Dabei stellt sich in einer komplexen, westlichen Gesellschaft einerseits unmittelbar die Frage nach dem Einfluss der Jahrtausende alten schriftlichen Tradition. Andererseits interessieren die Auswirkungen der rechtlichen und ökonomischen Regulierung auf die gegenwärtige Praxis. Diese beiden Aspekte sind insbesondere für den Vergleich der Resultate mit anderen Ländern Europas und mit Medizinsystemen ausserhalb Europas interessant.
Im Folgenden wird ein kurzer Ausblick auf die zu publizierenden Resultate geboten.

Pflanzenauswahl

In der Schweiz existieren lebendige Netze von Kräuterkundigen, die ihr Wissen auf unterschiedliche Art und Weise erworben haben und in professionellem oder privatem Rahmen mit Heilpflanzen arbeiten, sie anwenden, zu Heilmitteln / Hausmitteln verarbeiten oder anbauen. In der medizinischen Landschaft der Schweiz [1] gibt es unterschiedliche
Optionen zum Einsatz von Heilpflanzen. Im privaten Umfeld sind es hauptsächlich Hausmittel und im professionellen Bereich erfolgt der Einsatz von Heilpflanzen im Rahmen der wissenschaftlich begründeten Biomedizin (Schulmedizin) oder der Komplementär- und Alternativ-Medizin (z.B. Naturheilkunde). Aufgrund von Interviews mit Kräuterkundigen aus diesen drei Bereichen zeichnet sich eine erstaunlich ähnliche Auswahl an Heilpflanzen ab, die bevorzugt genutzt werden, u.a. zählen

[1] published as: Dal Cero M, 2012: Heilpflanzen in der medizinischen Landschaft der Schweiz. Schweiz Z Ganzheitsmed 24:293–296.

zu den Favoriten: *Taraxacum officinale*, *Hypericum perforatum*, *Melissa officinalis*, *Symphytum officinale*, *Thymus* spp. und *Urtica dioica* [2].

Abb. 5.1 Zu den meist genannten Arzneipflanzen gehören unter anderen: *Taraxacum officinale*, *Hypericum perforatum*, *Urtica dioica* , *Symphytum officinale* und *Thymus serpyllum*.

Daneben gibt es eine breite Auswahl an Pflanzen, die nur vereinzelt in einem der drei Bereiche als Spezialitäten genutzt werden.

Abb. 5.2 *Leontopodium alpinum*, gelegentlich Bestandteil von Kräuterteemischungen; Rhizom geschnitten von *Potentilla erecta* in Tinkturen, *Angelica archangelica* Blütendolden

Bei den Hausmittel-Zubereitungen stehen Tees, Tropfen (Tinkturen) sowie äussere Anwendungen (Wickel, Kompressen, Salben) im Vordergrund [2]. In den professionellen Bereichen werden hauptsächlich Tees, Tinkturen und pflanzliche Fertigarzneimittel eingesetzt.

Wissenserwerb

Der zweite Forschungsschwerpunkt befasst sich mit den aktuellen Tätigkeiten, Arbeitsweisen und dem Wissenserwerb der Kräuterkundigen. In der vielfältigen „Heilpflanzenszene" in der Schweiz sind unterschiedliche Arbeitsmodelle und Denkweisen anzutreffen: von der wissenschaftlich fundierten Phytotherapie zu überlieferten volksheilkundlichen Vorstellungen bis hin zu mehr spirituell geprägten Ausrichtungen.

Wichtige Quellen zur Wissensaneignung sind gemäss Angaben der Expertinnen und Experten einerseits Bücher und andererseits Lehrpersonen in Aus- und Weiterbildungen. Dabei dienen hauptsächlich zeitgenössische Kompendien als Nachschlagewerke in der alltäglichen Praxis (z.B. Weiss/Fintelmann [3], Wichtl [4], Bühring [5]). Heute leicht zugängliche historische Werke, z.B. von Hildegard v. Bingen [6], Paracelsus [7], Leonhardt Fuchs [8] oder Tabernaemontanus [9] werden gern als Inspirationsquellen verwendet [2].

Allgemein scheint der Wert der Professionalisierung bei Heilpflanzen-Anwendungen einen wichtigen Stellenwert einzunehmen. So wird beispielsweise in Interviews gern erwähnt, dass man über eine fundierte (anerkannte) Ausbildung in diesem Bereich verfügt. Das Angebot an Aus- und Weiterbildungen zum Thema Kräuter und Heilpflanzen ist in den letzten Jahren fast unüberschaubar geworden. In diesem Zusammenhang interessieren auch Auswirkungen der gegenwärtigen Berufsreglementierung im Alternativmedizinischen Bereich, die auch die Ausbildung in Pflanzenheilkunde / Phytotherapie betreffen [10].

Tradition

Zur Zeit wird der Begriff „Tradition" / „traditionell" in verschiedenen Diskussionen hervorgestrichen, oft ohne detaillierte Erläuterung, was darunter verstanden wird (vergl. beispielsweise den Begriff Traditionelle Europäische Naturheilkunde / Medizin). Allen unterschiedlichen Definitionen von „Tradition" gemeinsam ist, dass sie mit Überlieferung (mündlich und schriftlich) zu tun haben; mit der Vorstellung also, dass sich in diesen Überlieferungen die Summe der Erfahrungen vorhergehender Generationen niederschlägt. Konkret auf die Verwendung einzelner Heilpflanzen bezogen zeigt sich, dass sich der Begriff „traditionell" auf sehr unterschiedliche Zeiträume beziehen kann – nämlich auf einige hundert bis mehr als 2000 Jahre. So sind etliche Heilpflanzen, die heute noch in Gebrauch sind, bereits aus prähistorischen Funden der Bronzezeit (2200 – 800 v. Chr.) in der

Schweiz bekannt (wie z.B. *Achillea millefolium*, *Linum usitatissimum* und *Sambucus nigra*). Andere heute gebräuchliche Heilpflanzen wurden durch die Klöster im frühen Mittelalter eingeführt (z.B. *Angelica archangelica*, *Glechoma hederacea*, *Hyssopus officinalis*, *Lavandula angustifolia*, *Rosmarinus officinalis* und *Salvia officinalis*). Pflanzen vom amerikanischen Kontinent fanden erst in der Folge von ausgedehnten Entdeckungsreisen im 16. / 17. Jahrhundert langsam Akzeptanz in Europa (z.B. *Cucurbita maxima*, *Rosa rugosa*, *Solanum tuberosum*, *Zea mais*). Und schliesslich sind einige heute beliebte Heilpflanzen (z.B. *Echinacea* spp. und *Helianthus annuus*) unter diesem Blickwinkel erst vor relativ kurzer Zeit ins Zentrum des Interesses gerückt, nämlich anfangs des 20. Jahrhunderts [11].

Die aktuell genutzte Auswahl an Heilpflanzen ist das Produkt einer langen Entwicklung, bei der neue Pflanzen für kürzere Zeitabschnitte als Heilpflanzen dokumentiert wurden oder gar definitiv in den Arzneipflanzenschatz aufgenommen wurden. Gleichzeitig gerieten andere Arten wieder in Vergessenheit. Anhand zahlreicher Kräuterbücher aus den unterschiedlichsten Epochen ist die Arzneipflanzenauswahl seit rund 2000 Jahren schriftlich dokumentiert und nachvollziehbar. Zur genaueren Untersuchung dieser Veränderungen in der Heilpflanzenauswahl legt die westliche Medizingeschichte [12] eine Einteilung in die nachfolgend beschriebenen fünf Epochen nahe. Ausgangspunkt ist die griechisch-römische Antike. Die Materia medica von Dioskurides aus dem 1. Jahrhundert n. Chr. gehört zu den einflussreichsten schriftlichen Dokumenten aus dieser Epoche und beschreibt neben vielen typischen Mittelmeerarten auch rund 340 Pflanzen der Schweizer Flora. Dokumente aus dieser ersten Epoche dürften im Gebiet der heutigen Schweiz seit der Herrschaft des Römischen Reichs um die Zeitenwende bekannt sein. Nach dem Untergang des römischen Reiches begann die Epoche der Klostermedizin (8. Jhd. – 12. Jhd.). Das antike Wissen wurde in den Klöstern aufbewahrt, neu kompiliert, ergänzt und angepasst weitergegeben. So beispielsweise auch im einflussreichen Kloster St.Gallen. In dieser Epoche wurden neu viele Heilpflanzen der Schweizer Flora beschrieben, insgesamt sind in den verbreitetsten Codizes jener Epoche über 400 verschiedene Arzneipflanzen zu finden [11]. Ab dem 15. / 16. Jahrhundert schliesst die Epoche der Renaissance an, die gekennzeichnet ist einerseits durch die Rückbesinnung auf die griechischen Autoren (nach dem Motto „ad fontes“), andererseits durch die Erfindung des Buchdrucks sowie die grossen Entdeckungsreisen zu neuen Kontinenten. Diese drei Faktoren begünstigten die rasche Verbreitung und Vermehrung von Heilpflanzenwissen. In den berühmten Kräuterbüchern dieser Epoche (Fuchs, Lonicerus, Tabernaemontanus u.a.) sind rund 500 Heilpflanzen der Schweizer Flora zu finden. Damit ist das Maximum an dokumentierten Heilpflanzen erreicht [11]. In der folgenden Epoche der Moderne, als im Laufe des 19. Jahrhunderts die Bedeutung der modernen Naturwissenschaften für die Medizin stetig zunahm, verloren Arzneipflanzen gleichzeitig ihre Monopolstellung als Hauptressourcen für Arzneimittel. Die Anzahl der dokumentierten Heilpflanzen ging auf unter 400

Arten zurück. Und mit der zunehmend besseren schulmedizinischen Versorgung seit Mitte des 20. Jahrhunderts auch in ländlichen, abgelegenen Teilen der Schweiz verlieren Heilpflanzen auch als Hausmittel an Bedeutung. Diese Entwicklungen zeigen sich direkt in der Anzahl an dokumentierten Arzneipflanzen in zeitgenössischen Kräuterbüchern, die gegenüber dem 19. Jahrhundert weiter drastisch zurückgegangen ist. Mit rund 250 Arzneipflanzen, die von Kräuterkundigen aktuell in Gebrauch sind, wird ein sehr tiefer Stand erreicht im Vergleich zu den Epochen der Klostermedizin und Renaissance [11]. Dieser Rückgang ist auf mehrere Ursachen zurückzuführen. Eine wichtige Rolle spielt dabei die aktuelle medizinische Landschaft, in der die Anwendung von Heilpflanzen nur eine von vielen Optionen ist. Inwiefern heute nicht mehr gebräuchliche Arten zu Unrecht in Vergessenheit geraten sind, wurde für einzelne Krankheiten (z.B. für rheumatische Erkrankungen [13]), in Bezug auf einzelne Regionen (z.B. Italien [14]) oder historische medizinische Texte (z.B. Iatrosophia Texte in Zypern [15]) bereits untersucht. Andere Arten sind wohl wegen ungenügender Wirkung, fehlender Nachfrage oder schwieriger Beschaffung nicht mehr verwendet worden.

Stand der Studie und Ausblick

Der aus den bisherigen Resultaten gewonnene Überblick für die deutschsprachige Schweiz erlaubt, die für einzelne Regionen der Schweiz existierenden ethnobotanischen Daten (Napf BE/ LU [16], Val d'Anniviers VS [17], Chasseral JU [18], Tessin [19]) in einen grösseren Kontext zu stellen.

Der historische Überblick zur Anzahl der dokumentierten Heilpflanzen in verschiedenen Epochen zeigt, dass vor allem die Kräuterbücher der Renaissance aufgrund der hohen Anzahl an dokumentierten Pflanzen eine interessante Quelle für weitere ethnobotanische und ethnopharmakologische Forschung sein können.

„Tradition ist nicht das Halten der Asche, sondern das Weitergeben der Flamme." Thomas Morus 1478 - 1535

Im Sinne von Thomas Morus zeigt das rege Interesse, mit dem die aktuelle Studie bei den betreffenden Interview-PartnerInnen auf genommen wird, dass eine lebendige Kräuterkunde weiterentwickelt und dadurch das Feuer auch an nachfolgende Generationen weitergegeben wird.

Aktuell geht nun ein Workshop mit interviewten Expertinnen und Experten der Frage nach „Kräuterkunde in der Schweiz – wohin?" Die Praktikerinnen und Praktiker, die täglich mit Arzneipflanzen zu tun haben, erhalten da die Möglichkeit, eine Zukunftsperspektive für die Kräuterkunde in der Schweiz zu entwerfen. Die aktuelle Studie schafft ihrerseits einen Überblick über die aktuelle Situation als wissenschaftliche Diskussionsgrundlage für die Weiterentwicklung der Kräuterkunde in der Schweiz.

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5.2 Was kann die Volksmedizin zum therapeutischen Wissen beitragen?[2]

Einleitung

Schweizer Volksheilkunde ist ohne ihren Arzneipflanzenschatz undenkbar. Heilpflanzen werden als Hausmittel innerlich und äusserlich verwendet, in speziellen Zubereitungen für Naturheilverfahren oder als wissenschaftlich evaluierte Phytopharmaka. Im Laufe der letzen Jahrhunderte hat sich die Zusammensetzung dieses Arzneipflanzenschatzes vielfach verändert: neue Pflanzen kamen durch die Entdeckung bisher unbekannter Florenreiche dazu, andere sind wieder in Vergessenheit geraten [1]. Die Auswahl von Arzneipflanzen aus der lokal vorhandenen Flora erfolgte ursprünglich aufgrund von sensorisch leicht erkennbaren Inhaltsstoffen wie Bitterstoffen, ätherischen Ölen oder Gerbstoffen und aufgrund von beobachteten Wirkungen. Doch spielen auch kulturelle Faktoren eine wichtige Rolle in diesem Auswahlprozess. So ist der gegenwärtige Gebrauch der Medizinalflora der Schweiz das Resultat einer jahrtausende alten Entwicklung im Wechselspiel zwischen lokal vorhandener Flora sowie kulturellen, gesellschaftlichen und wirtschaftlichen Rahmenbedingungen. Bis in die Gegenwart findet dieser Auswahlprozess seine Fortsetzung durch die intensive Auseinandersetzung zwischen den unterschiedlichen Standpunkten in der medizinischen Landschaft der Schweiz (Schulmedizin, Alternativ- und Komplementärmedizinische Verfahren sowie familiäre und lokale Traditionen). Dabei stehen beispielsweise neue wissenschaftliche Erkenntnisse im Spannungsfeld mit Überlieferungen, wie z.B. beim Huflattich *Tussilago farfara* oder wirtschaftliche Überlegungen führen zu einer Veränderung im Angebot von pflanzlichen Arzneimitteln.

Charakterisierung der Schweizerischen Medizinalflora

Eine aktuelle ethnobotanische Studie charakterisiert verschiedene Aspekte der Medizinalflora der Schweiz [2]. Ergebnisse von 61 Experteninterviews mit kräuterkundigen Menschen (Heilpflanzen-ExpertInnen) in der deutschsprachigen Schweiz zeigen, dass rund 250 Arzneipflanzen gegenwärtig aktiv in Gebrauch sind [2]. Dies entspricht gut 30% der 770 Arzneipflanzen, die in den 2000 Jahren schriftlicher Tradition in Mitteleuropa dokumentiert sind [1]. Zu den am häufigsten verwendeten Arzneipflanzen gehören *Taraxacum officinale*, *Hypericum perforatum*, *Melissa officinalis*, *Symphytum officinale*, *Thymus* spp. und *Urtica dioica* (Abb. 1). Aktuelle ethnobotanische Studien in unterschiedlichen Regionen der Schweiz (Emmental [3], Jura [4], Val d'Anniviers [5],Tessin [6] und

[2] Published as: Dal Cero, M., 2014: Was kann die Volksmedizin zum therapeutischen Wissen beitragen? Ars Medici Thema Phytotherapie 1/2014.

Prättigau [7]) zeigen ähnliche Ergebnisse in der Gesamtzahl der genutzten Pflanzen, jedoch unterschiedliche regionale Präferenzen, u.a. abhängig von der lokal vorhandenen Flora.
Ein Vergleich der bevorzugten Pflanzen bei Expertinnen und Experten sowie Laien (Studierenden) zeigen ebenfalls deutliche Unterschiede in den Präferenzen. So steht bei den Laien die Kamille mit grossem Abstand an der Spitze der verwendeten Arzneipflanzen (Abb. 2) mit Erwähnung in 83% der Fragebögen bzw. 10% der Use-reoports (d.h. einer spezifischen Anwendung einer bestimmten Arzneipflanze). Die Kamille wird vielfältig eingesetzt: bei Verdauungsbeschwerden, lokalen Entzündungen, Erkältungen oder zur Nervenberuhigung. Insgesamt besteht die Auswahl der am häufigst genannten Arzneipflanzen aus allgemein gut bekannten und in der Praxis bewährten Pflanzen. Bei etlichen besteht auch breite wissenschaftliche Evidenz zur Wirkung wie z.B. bei Kamille, Thymian, Johanniskraut, Baldrian.

Der detaillierter Blick auf die Zusammensetzung der aktuell genutzten Medizinalflora zeigt eine klare Bevorzugung bestimmter Pflanzenfamilien (Apiaceae, Lamiaceae, Pinaceae, Rosaceae u.a.), die alle sensorisch leicht erkennbare Inhaltsstoffe enthalten [1, 2]. Auch in anderen Medizinalsystemen der nördlichen Hemisphäre werden diese Pflanzenfamilien bevorzugt.

Die häufigste Zubereitungsform ist der Kräutertee (44%), gefolgt von Tinkturen (20%), Öl-Auszügen (5%), ätherischen Ölen (4%), Nahrungsmitteln (4%), Salben (3%) und Wickel / Kompressen (3%) [2].
Indikationen für die Anwendung von Arzneipflanzen sind folgende Kategorien in abnehmender Reihenfolge: Haut, Atemwege, Nerven, Verdauungstrakt, allgemeine Stärkung, Bewegungsapparat, Frauenheilkunde, Urogenitaltrakt, Detoxifizierung (Entgiftung / Entschlackung), Herzkreislauf [2].

Therapeutische Aspekte

Aus den qualitativen Ergebnissen der Experten-Interviews lassen sich einige Merkmale volksheilkundliche Arzneipflanzenanwendungen ableiten.
1. Es gibt ein breites Verständnis, was eine Heilpflanze ist – von gesundheitsfördernden Nahrungspflanzen (z.B. *Taraxacum officinale*, *Urtica dioica*) über Gewürze (z.B. *Rosmarinus officinalis*, *Thymus vulgaris*) bis zu eigentlichen Arzneipflanzen (z.B. *Arnica montana*, *Hypericum perforatum*, *Gentiana lutea*) . Giftpflanzen (wie z.B. *Atropa belladonna*, *Aconitum napellus*.) werden hauptsächlich in homöopathischen Zubereitungen verwendet, um Vergiftungen zu vermeiden.

2. Zwei wichtige Strategien zum Einsatz von Medizinalpflanzen sind Prävention (v.a. bei gesundheitsfördernden Nahrungspflanzen und Gewürzen) und Detoxifizierung / Entgiftung (v.a. bei gesundheitsfördernden Nahrungspflanzen und eigentlichen Arzneipflanzen).

3. Die volksheilkundliche Verwendung von Pflanzen ist stark geprägt vom Gedanken der Selbstverantwortung (Empowerment). Pflanzen werden zur selbständigen und selbstbestimmten Gesundheitsförderung eingesetzt, oft auch als komplementäre Anwendungen zu anderen Therapien.

4. Arzneipflanzen werden in ihrem kulturellen Kontext eingesetzt. Unzählige heitere oder abenteuerliche Geschichten ranken sich um die Arzneipflanzen. Das Erzählen dieser Geschichten, das Beschreiben, woher eine Pflanze kommt, die Einbindung in den lokalen Kontext sind wichtige Elemente der volksheilkundlichen Anwendungen.

5. Die sinnliche Wahrnehmung der Arzneipflanzen (Duft, Farbe, Geruch) spielt in den Anwendungen eine wichtige Rolle. So wird die Beschäftigung mit den Pflanzen an sich bereits als förderlich wahrgenommen sowohl für die behandelte als auch für die behandelnde Person. Dabei steht oft ein intensiver emotionaler Bezug zu den Pflanzen als ästhetische Lebewesen im Zentrum.

Diese Aspekte der volksheilkundlichen Arzneipflanzenanwendungen können durchaus auch eine rationale, evidenzbasierte Phytotherapie sinnvoll ergänzen.

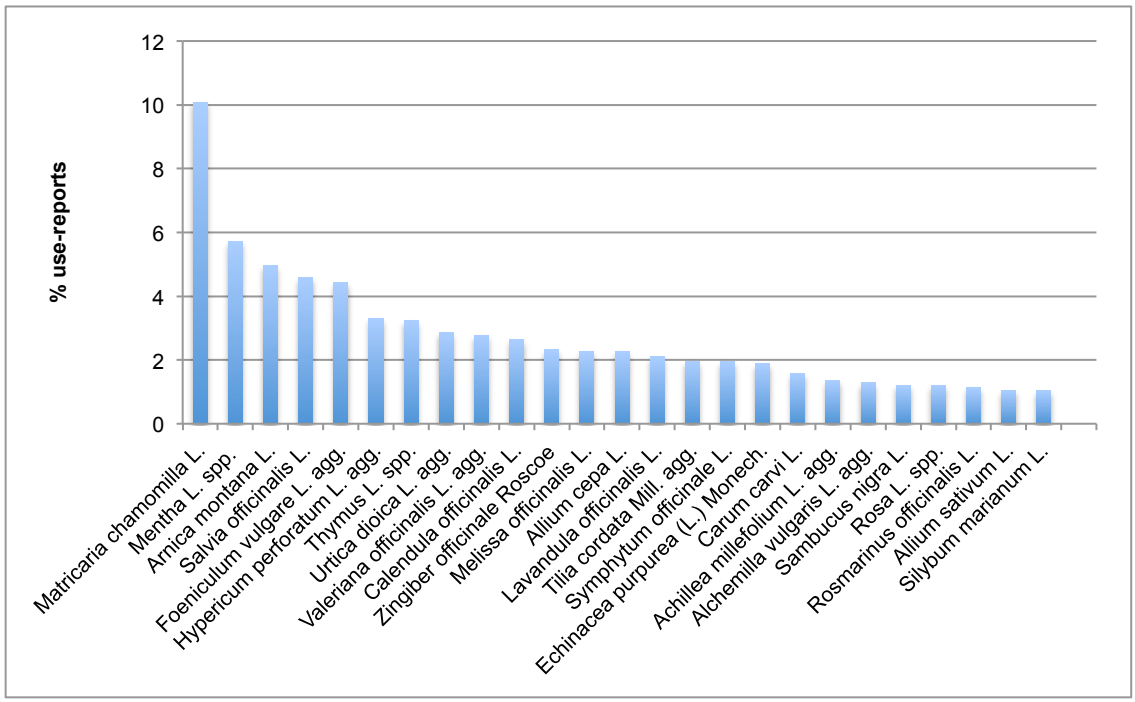

Abb. 5.3 25 Arzneipflanzen, die am häufigsten von Laien (n=161) genannt wurden.

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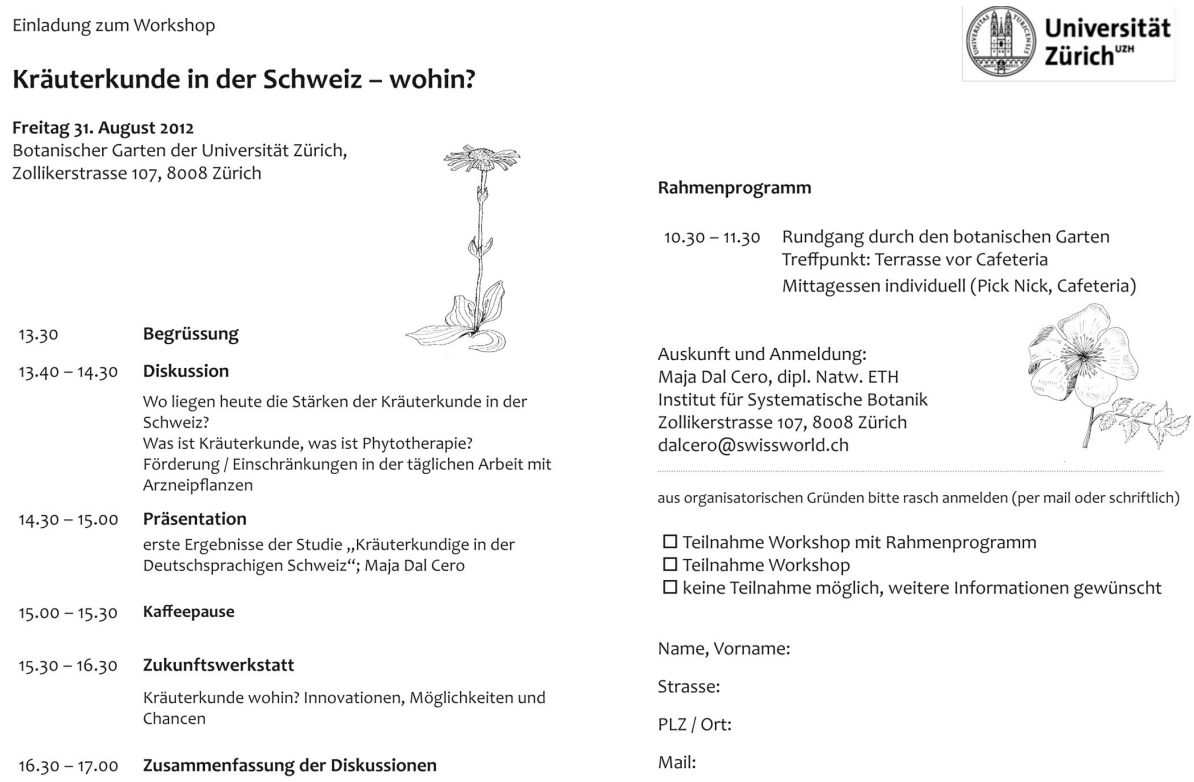
5.3 Workshop: Kräuterkunde in der Schweiz – wohin?

Nach Abschluss der Feldarbeit (2012) haben wir die Interviepartnerinnen und Interviewpartner zu einem Workshop in den Botanischen Garten nach Zürich eingeladen (Abb. 5.4). Ziel des Workshops war das Gespräch und den vielfach gewünschten Austausch zwischen den Kräuterkundigen in den verschiedenen Bereichen der medizinischen Landschaft zu fördern. Von den insgesamt 61 Interviepartnern haben 19 am Workshop teilgenommen und weitere 15 Personen haben sich entschuldigt und gewünscht per Protokoll auf dem Laufenden gehalten zu werden.



Einladung zum Workshop

Kräuterkunde in der Schweiz – wohin?

Freitag 31. August 2012
Botanischer Garten der Universität Zürich,
Zollikerstrasse 107, 8008 Zürich

13.30	**Begrüssung**
13.40 – 14.30	**Diskussion** Wo liegen heute die Stärken der Kräuterkunde in der Schweiz? Was ist Kräuterkunde, was ist Phytotherapie? Förderung / Einschränkungen in der täglichen Arbeit mit Arzneipflanzen
14.30 – 15.00	**Präsentation** erste Ergebnisse der Studie „Kräuterkundige in der Deutschsprachigen Schweiz"; Maja Dal Cero
15.00 – 15.30	**Kaffeepause**
15.30 – 16.30	**Zukunftswerkstatt** Kräuterkunde wohin? Innovationen, Möglichkeiten und Chancen
16.30 – 17.00	**Zusammenfassung der Diskussionen**

Universität Zürich[UZH]

Rahmenprogramm

10.30 – 11.30	Rundgang durch den botanischen Garten Treffpunkt: Terrasse vor Cafeteria Mittagessen individuell (Pick Nick, Cafeteria)

Auskunft und Anmeldung:
Maja Dal Cero, dipl. Natw. ETH
Institut für Systematische Botanik
Zollikerstrasse 107, 8008 Zürich
dalcero@swissworld.ch

aus organisatorischen Gründen bitte rasch anmelden (per mail oder schriftlich)

☐ Teilnahme Workshop mit Rahmenprogramm
☐ Teilnahme Workshop
☐ keine Teilnahme möglich, weitere Informationen gewünscht

Name, Vorname:

Strasse:

PLZ / Ort:

Mail:

Abb. 5.4 Einladung zum Workshop

Die Ergebnisse des Workshops sind im nachfolgenden Protokoll festgehalten und wurden den Teilnehmenden zugestellt.

Protokoll Workshop: „Kräuterkunde in der Schweiz – wohin?“

Freitag 31. August 2012, Institut für Systematische Botanik der Universität Zürich

Teilnehmende:
- 19 Heilpflanzen-Expertinnen und Experten, die im Rahmen der Studie „Kräuterkundige in der deutschsprachigen Schweiz“ an Experten-Interviews teilgenommen haben
- Maja Dal Cero, Doktorandin Institut für Systematische Botanik der Universität Zürich
- Ursula Wegmann, Masterstudentin, Institut für Systematische Botanik der Universität ZH
- Prof. Dr. R. Saller, Universitätsspital Zürich, Institut für Naturheilkunde

Im Folgenden sind die Ergebnisse der Gruppen-Diskussionen anhand der handschriftlichen Notizen der einzelnen Teilnehmenden auf die gestellten Fragen sowie aufgrund der Plenums-Diskussion zusammengefasst.

1. Einschätzung des eigenen Arbeitsumfeldes

Frage: Was macht Ihnen Freude in der täglichen Arbeit mit Heilpflanzen?
- Bezug zur Natur (Lebendigkeit)
- Wirksamkeit, Sinnlichkeit
- Sensorik, Erfahrung mit allen Sinnen
- Sammeln, Kompositionen, Rezeptur, Anwendung
- Einfachheit, Intuition
- Lern- und Erfahrungsprozess
- Ehrfurcht

Frage: Was ärgert Sie in der täglichen Arbeit mit Heilpflanzen?
- Gesetzliche Einschränkungen (EMR)
- Swissmedic
- Mangelnde Geduld bei therapeutischen Massnahmen – hohe Erwartung der Patienten
- fehlendes Verständnis von der Schulmedizin gegenüber Pflanzenheilkunde
- Bequemlichkeit der Patienten
- Keine Lobby -> Anerkennung (gesetzlich und beruflich), kein Verband (mehr) und keine Standards
- Phytotherapie müsste eigenständige Therapieform sein

2. Stellung der Pflanzenheilkunde in der aktuellen medizinischen Landschaft der Schweiz
Frage: Warum ist es auch in der heutigen Zeit sinnvoll Heilpflanzen anzuwenden?
- Verlust des Wissens; Wissen muss gefördert werden
- Ängste gegenüber Pflanzen(-anwendungen) sind vorhanden
- Selbstmedikation
- Selbstverantwortung
- Kosten?
- Heilpflanzen haben es manchmal schwer, neben dem Einfluss der Pharma zu bestehen
- Möglichkeit zur Sensibilitätsentwicklung gegenüber der Natur

3. Grundlagenwissen
Frage: Was müssen Kräuterkundige / Phytotherapeutinnen wissen?

Kräuterkundige	Phytotherapeuten
Botanik – Pflanzenkenntnisse -> möglichst viele kennen	Botanik – Pflanzenkenntnisse -> je nach Schule (40 – 160), Pflanzen kennen, die man anwendet
- Pflanzenteile (Inhaltstoffe der Drogen) - Zubereitung	- Pflanzenteil - Inhaltsstoffe der Drogen - (Zubereitung)
Indikationen / Kontraindikationen Anwendung - wie? - wo? - wann? - wieviel?	Indikationen / Kontraindikationen Anwendung - wie? - wo? - wann? - wieviel?
Haltung / Beziehung zu Pflanzen / Ökosystem	Denkmodelle kennen (ohne dogmatisch zu sein) Haltung / Beziehung zu Pflanzen + Mensch / therapeutische Haltung
	medizinische Grundkenntnisse Grenzen erkennen

4. Forschungsperspektiven
Frage: Was könnte im Zusammenhang mit Heilpflanzen erforscht werden?

Grundsätzlich braucht es eine Forschung, aber welche? –> Ebene
- Wirkstoffe
- Ausrichtung / Produkte
- Themen-Aufteilung -> Koordination
- auch Wunsch nach „ganzheitlicher, umfassender“ Forschung, die Gesamtbild erfasst

Feldforschung
Einbezug Praktizierender
-> Einzelerfahrung austauschen -> Vernetzung -> Stärkung
-> Begriffsdefinition; einheitliche Sprache
- woher bekommen wir Geld! Forschungsförderung marginal
- Strategie / Konzept zur Forschung fehlt: (medizinische) Mainstream oder Aussenseiter Forschung?

5. Schlussfolgerungen
Als Konsens aus den intensiven Gesprächen haben sich folgende Punkte ergeben:

Der Wunsch nach einem Netzwerk „Kräuterkunde“ mit folgenden Zielen ist vorhanden:
- Entwicklung einer Strategie zur Stärkung der Position der Kräuterkunde / Phytotherapie in der medizinischen Landschaft
- Geld-Akquisition zur Forschungsförderung
- Fachaustausch, evtl. Symposium zu aktuellen Themen

Im Rahmen der aktuell laufenden Forschungsarbeit wird im Spätsommer 2013 ein Folge-Workshop durchgeführt. Thema noch offen, wird mit der Einladung bekannt gegeben.

Für das Protokoll: Maja Dal Cero, Januar 2013

Am 25. Oktober 2013 fand der zweite Workshop mit der Frage nach den Forschungspersektiven statt (Abb. 5.5). Insgesamt 12 Personen nahmen teil.

Einladung zum zweiten Workshop

Kräuterkunde - Forschungsperspektiven?

Universität Zürich[UZH]

Freitag 25. Oktober 2013
Botanischer Garten der Universität Zürich,
Zollikerstrasse 107, 8008 Zürich

Treffpunkt: Terrasse vor der Cafeteria

13.30 **Begrüssung**

13.40 – 14.30 **Diskussion – Teil 1**
Wo findet Arzneipflanzenforschung in der Schweiz statt?

14.30 – 15.00 **Präsentation: Ethnobotanik im Prättigau; Medizinalpflanzen – Nutzung und Wissen**
Masterarbeit, Ursula Wegmann

15.00 – 15.30 **Kaffeepause**

15.30 – 16.30 **Diskussion – Teil 2**
Welche (Forschungs-) Fragen sind im Zusammenhang mit Heilpflanzen aktuell und wichtig?

16.30 – 17.00 **Zusammenfassung der Diskussionen**

Rahmenprogramm

10.30 – 11.30 Rundgang durch den Botanischen Garten und die neu eröffneten Schauhäuser
Treffpunkt: Terrasse vor Cafeteria
Mittagessen individuell (Pick Nick, Cafeteria)

Auskunft und Anmeldung:
Maja Dal Cero, dipl. Natw. ETH
Institut für Systematische Botanik
Zollikerstrasse 107, 8008 Zürich
dalcero@swissworld.ch

aus organisatorischen Gründen bitte rasch anmelden (per mail oder schriftlich)

☐ Teilnahme Workshop mit Rahmenprogramm
☐ Teilnahme Workshop
☐ keine Teilnahme möglich, weitere Informationen gewünscht

Name, Vorname:

Strasse:

PLZ / Ort:

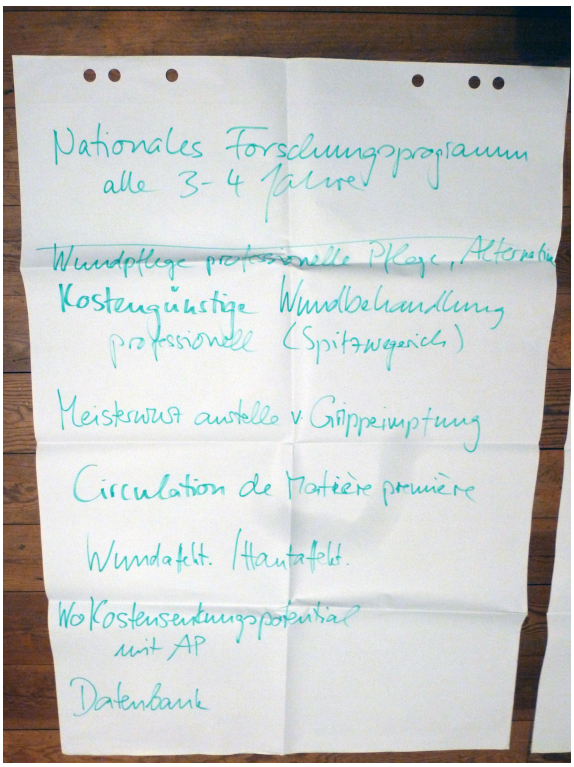
Mail:

Abb. 5.5 Einladung zweiter Workshop

Die Diskussionsergebnisse des zweiten Workshops wurden auf Postern festgehalten (Abb. 5.6). Einerseits wurde diskutiert, ob ein nationales Forschungsprojekt im Rahmen der praktischen Arzneipflanzen-Anwendung anzustreben wäre. Folgende Forschungsfragen sind aus Sicht der teilnehmenden Personen aus verschiedenen Blickwinkeln zur Zeit relevant: Alternative Wundpflege (Anregung aus der Praxis: Pflegefachfrau), Meisterwurz als ‚Grippepflanze' (Anregung von CAM: Naturheilpraktiker), Kostensenkungspotential mit Arzneipflanzen (Anregung von Berufsverbandseite), Erstellung einer Datenbank zur nicht ärztlichen Nutzung von Arzneipflanzen. Es wurde auch darauf hingewiesen, dass in der Abteilung für Phytopharmazie an der ZHAW Wädenswil zur Zeit einiges an Analytik der Arzneipflanzen untersucht wird.

Die Frage, wo und wie man sich auch als Laie über den aktuellen Forschungsstand informieren kann wurde mit dem Hinweis auf die Schweizerische Medizinische Gesellschaft (SMGP), deren Website sowie Jahrestagung sowie dem Nachdiplomstudiengang CAS in Ethnobotanik und Ethnomedizin

hingewiesen. Als relevante Fachzeitschrift für die Schweiz wurde die Schweizerische Zeitschrift für Ganzheitsmedizin genannt.



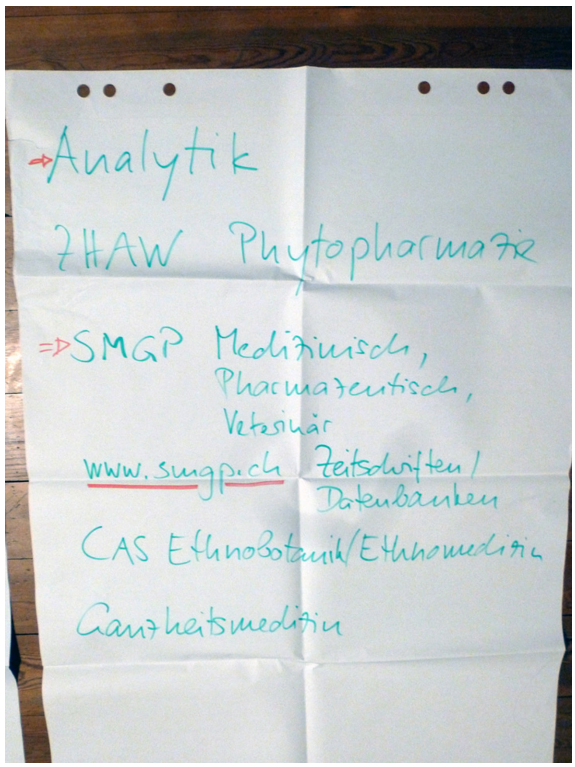


Abb. 5.6 Diskussionsergebnisse aus dem Workshop vom 25.10.2013

Das Interesse und die regen Diskussionen in den Workshops hat deutlich das Bedürfnis nach Austausch-Plattformen und Netzwerken für die Heilpflanzen-Experten und –Expertinnen in den verschiedenen Bereichen der medizinischen Landschaft der Schweiz gezeigt. In welcher Form dieser Austausch weiter geführt werden soll ist zur Zeit noch offen, es werden verschiedene Möglichkeiten im Rahmen von bestehenden Netzwerken diskutiert.

CHAPTER 6

SYNOPSIS

Based on our investigation of medicinal plant use in Switzerland we try now to answer our initial question: 'How many medicinal plants do exist in Switzerland?' The answer is not a specific number but we have to reflect quantitative and qualitative aspects of continuity and change over two millennia.

Focusing on herbalists in the German speaking part of Switzerland, we recorded 254 medicinal plants actually used for self-medication and professional health care (cf. Chapter 2). Interestingly, despite different underlying medicinal concepts and philosophies, herbalists largely agree on the most important medicinal plant species. This finding is in contrast to the often-heard reassurances of interviewees, that herbalists from different parts of the medicinal landscape (e.g. biomedical or different fields of complementary and alternative medicine) differ tremendously regarding plant use. Thus, it seems that from an emic percpective differences are paramount while an etic perspective mainly reveals similarities. This phenomenon is described by Sihls (1981:13-15) in the context of tradition. From an emic perspective the *own* tradition is often perceived as very different from the *other* tradition, while an etic perspective may find many similarities and/or a common origin. Experts of different parts of the medicinal landscape, tend to forget that they all refer to the same locally available flora and the same written heritage. A shared and identity-establishing written heritage still allows for different local preferences in different regions as shown in recent European cross-cultural studies (Bellia & Pieroni, 2015; Mustafa, 2015).

Ethnobotanical documentation of local medicinal plant knowledge in remote areas of the world is closely related to the conservation of endangered knowledge (Weckerle et al., 2006; Bradacs et al., 2011). Especially orally transmitted knowledge is endangered to get lost by each transition from one generation to the next. In Switzerland we could not find a coherent body of orally transmitted herbal practices, except of the personal experience, which is accumulated through practice over a life time. Also, knowledge transmitted in contemporary popular herbals is rooted in historical books and written transmission (e.g., Johann Künzle was inspired by the Renaissance herbal of Tabernaemontanus, cf. Künzle, 1945). Obviously, the influence of written knowledge transmission is

overwhelming in Europe and plays an important role in conserving knowledge over a long time period (Weckerle et al., 2009; Leonti, 2011).

Depending on the time scale, knowledge can be seen as in danger of getting irreversibly lost (short term perspective), but the same process may be interpreted retrospectively as adjustment of tradition due to changing living conditions (e.g., decrease of rural population, technological changes, decrease of exclusive reliance on medicinal herbs). Therefore, the question about the central aspects of the *traditum* is crucial. This is especially the case for ethnobotanical studies conducted in highly regulated environments with strong influence of written knowledge transmission.

Our study about herbalists offers insights into medicinal plant practices in different parts of the medicinal landscape and therefore helps to understand different subcultures. We hope to contribute to an intensive communication between these subcultures to promote a common strategy of effective and safe medicinal plant use.

In our comparison of past and recent medicinal plant knowledge in Chapter 3 we found that in total a considerable share (overall time periods 32%, 768 species) of the Swiss flora has been used for medicinal purposes over the last two millennia, with a remarkable increase in 16th century Renaissance (476 spp.; cf. Chapter 3). Since the Renaissance the share of medicinal plants remained stable, only the species used changed due to newly introduced species from the Americas and Australia. In recent ethnobotanical studies the use of ca. 304 spp. from the Swiss flora is documented. We can conclude that between 300 and 500 species of the available flora in Switzerland have been medicinally used in a given time period.

Approximately 100 species have been documented through all time periods and as such have a long tradition of use over numerous generations. Our diachronic overview also highlights the close link between medicinal plant *tradition* and *trade* (tradition and trade both stem from the Latin verb *tradere*, 'hand over' or 'surrender'). New trade routes, e.g. during the Renaissance, fostered the exchange of medicinal plants and medicinal concepts alike which easily got integrated into the existing medicinal flora and medicinal practices (Anagnostou, 2015; Freedman, 2015; Van der Veen&Morales, 2015).

In chapter 4 we added a new dimension to the discussion about 'traditional use'. We highlighted that the mere documentation and awareness of a medicinal plant does not automatically mean continuity in use. Most medicinal plants show a general extension of uses over time. But also a constant body of 129 specific uses for 56 medicinal plants was identified. These plants are used today in the same way as in antiquity, monastic medicine and Renaissance, regardless of fundamental changes of medicinal

concepts and technology. In some of the cases (27%) scientific evidence exists for the uses. This body of knowledge seems to be very robust even under dramatic changes of the socioeconomic and cultural environment.

For the other medicinal plant uses without scientific evidence but with high numbers of citations we assume a broad social validation, i.e., their use is broadly accepted and practiced, even if there is no scientific evidence available (Crellin, 2001 ; Helmstädter & Staiger, 2014). The use of these medicinal plants is presumably safe supported by carefully evaluated tradition of practice over generations (Helmstädter & Staiger, 2014). Additionally, for most medicinal plants exists at least scientific insight in phytochemical architecture and therefore knowledge about toxicity (Adams et al., 2012).

Without taking into account this social validation of medicinal plant use in regulatory affairs the interpretation of 'traditional use' can be unduly constricted (Helmstädter & Staiger, 2014). Therefore, one of the future challenges lies in the question: How can we shape a regulatory framework to be supportive (and not restrictive) of safe use of medicinal plants in a broad sense of tradition?

Outreach and outlook

The public outreach aimed to communicate our findings to the herbalists of the different parts of the medicinal landscape and to support the discussions between practitioners. To this end we published German articles in popular local phytotherapy journals and organized two workshops for herbalists. The lively discussions during the workshops emphasised the importance of the identity aspect when examining traditional medicinal plant knowledge. As shown for food plants (Jennings et al., 2014), medicinal plants can embody different meanings for people who use them. The rationale behind a medicinal plant use reveals only one aspect. For practical use of medicinal plants the aspect of "identity through tradition" can be an enormous support. People, when using plants in a traditional way, 'have a sense of being connected with an unbroken chain of generations which have some significant quality in common' (Sihls, 1981, p. 14). This effect can be used for example in homemade remedies as positive 'meaning response'. Organoleptic properties and sense perception of plants can give a feeling of familiarity and to be actively involved in the healing process.

Our multifaceted insight into the Swiss medicinal flora and its use over time lays the basis for further discussions on tradition / traditional use of medicinal plants. Especially relevant is the question: What exactly is the 'traditum' that is handed down from one generation to the next? This question is not only highly relevant in regulatory issues but also in respect to identity in different parts of the medicinal landscape (e.g., in the recently emerging concept of Traditional European Naturopathy /

Traditional European Medicine and in biomedicine). Ethnobotanical studies like the present one can contribute to clarify this question from an etic and emic perspective.

Medicinal plant use in Switzerland has the following in common independent of medicinal concepts: 1) plants from the available flora are selected and used for the maintenance of health and treatment of illnesses; 2) extracts of these medicinal plants (solvents are water, alcohol, oil, honey a.o.) are ingested or topically applied.

While ideas and explications about the effect of medicinal plants may vary considerably, the above can be interpreted as the central 'traditum' in Swiss medicinal plant use.

Since medicinal plant use has to fit actual requirements on safety and effectiveness, a focus on medicinal plants with a long use history is reasonable. For these plants traditional use may be interpreted as evidence for safety and effectiveness.

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APPENDIX

SUPPLEMENTAL MATERIAL

QUESTIONNAIRE

Interviews mit Kräuterkundigen

Questionnaire for herbalists

1. Informantin / Informant

1. Informant

1a Name, Vorname

1a name, first name

1b Ort

1b place

1c Geschlecht

1c sex

1d Alter

1d age

1e Berufsbezeichnung

1e profession

2. Tätigkeit

2. Occupation

2a Wie bezeichnen Sie die Tätigkeit, die sie ausüben? Wie bezeichnen Sie sich selbst?

2a What is your occupation? How do you call your self?

2b Können Sie vom Einkommen aus dieser Tätigkeit leben?

2b Can you live on your occupation?

2c Sind Sie therapeutisch tätig? (Eigeneinschätzung) Sind Sie EMR / Krankenkassen anerkannt?

2c Do you work as therapist? Are you accepted by the health insurances as a CAM therapist?

2d Wenden Sie Heilpflanzen im privaten Bereich / eigenen Haushalt an?

2d Do you use medicinal plants for self-medication, in your family?

2e Wie und an wen vermitteln Sie Ihr Wissen weiter?

2e How and to whom do you transmit your knowledge?

3. Heilpflanzen

3. Medicinal plants

3a Welche 5 Heilpflanzen nutzen Sie in Ihrer Tätigkeit am häufigsten? (Freelisting)

3a Which 5 medicinal plants do you use most often? (Freelisting)

3b Verwenden Sie Giftpflanzen (Fortepflanzen) in nicht potenzierter Form?

3b Do you use toxic plants in non-homeopathic form?

3c Haben Sie Erfahrung mit Halluzinogenen Pflanzen (z.B. Hanf)?

3c Do you use hallucinogenic plants?

3d Woher beziehen Sie die Heilpflanzen, die Sie brauchen? In welcher Qualität und Zubereitung?

3d Where do you get your medicinal plants from? In what quality and form of preparation?

3e Sammeln Sie selber Heilpflanzen oder bauen Sie sie im Garten an?

3e Do you collect medicinal plants or do you grow them in your home garden?

3f Wie viel Zeit verbringen Sie in direktem Kontakt mit den Pflanzen (Angabe z.B. Prozentual, täglich/wöchentlich usw. oder mehr oder weniger Zeit als für die theoretische Auseinandersetzung mit den Pflanzen)?

3f How much time do you spend working with plants? (answers in percentage, daily/ weekly, or more or less time than used for theoretical work with plants)

4. Werdegang / Ausbildung?

4. Education and professional training

4a Wo und wie haben Sie sich das Kräuterwissen hauptsächlich angeeignet?

4a Where and how did you learn about medicinal plants?

4b Über welchen Zeitraum erstreckte sich die Aneignung des Grundwissens ungefähr?

4b How long did it take to get your basic knowledge?

4c Wie bilden Sie sich weiter?

4c How do you upgrade your education?

4d Welche Lehrer / Lehrerinnen oder Bücher waren für Sie wegweisend?

4d Which teachers and books were most important for your training?

4e Wie beurteilen Sie Ihren Wissensstand? (praktische Erfahrung 1 - 5, theoret. Wissen 1 - 5)

4e How do you evaluate your knowledge? (practical experience 1 -5, theoretical knowledge 1 – 5)

5. Anwendung

5. Use of medicinal plants

5a Wie stellen Sie fest, welche Heilpflanze für eine bestimmte Situation passt? Wie stellen Sie selber eine Diagnose?

5a How do you select the appropriate medicinal plant in a specific situation? How do you make a diagnosis?

5b Mit welchen Krankheiten werden Sie am häufigsten konfrontiert? Wo sehen Sie die grössten Einsatzmöglichkeiten für Heilpflanzen?

5b Which diseases do you treat most often? Which are the most important fields for the use of medicinal plants?

5c Bei welchen Krankheiten verweisen Sie die Betroffenen weiter und an wen? Wo stossen Heilpflanzen an ihre Grenzen?

5c Which diseases do you not treat by yourself and to whom do you refer such a patient? Where are the limitations of medicinal plant use?

6. Weltbild / Menschenbild

6. Worldview / Conception of the human being

6a Was sind nach Ihrer Einschätzung die häufigsten Krankheitsursachen? Wie stellen Sie sich vor, dass der Mensch krank / gesund wird?

6a What are the most important causes for diseases? How do you explain that people get sick / get healthy again?

6b Wie stellen Sie sich die Wirkungsweise von Heilpflanzen vor?

6b How do you explain the effects of medicinal plants?

6c Ist es wichtig, dass der Anwender / die Anwenderin die Pflanze selber kennt oder können gekaufte Drogen / Zubereitungen gleich wirksam sein?

6c Is it important, that the user knows the medicinal plant? Or are unknown and bought plants and preparations as efficient?

7. Beziehungsnetz

7. Social network

7a Arbeiten Sie mit anderen Kräuterkundigen Menschen / Ärzten regelmässig zusammen?

7a Do you collaborate regularly with other herbalists / medicinal professionals?

7b Pflegen Sie einen regelmässigen Erfahrungsaustausch?

7b *Do you exchange experiences regularly with other herbalists?*

7c Welche kräuterkundigen Menschen kennen Sie (persönlich, von Vorträgen / Kursen, von Büchern, vom Hörensagen, aus dem Fernsehen)?

7c *Do you know other herbalists? (personally, from lectures / seminars, books, by hearsay, from television)*

7d Welche Interviewpartner/in empfehlen Sie mir?

7d *Whom would you suggest as interviewee?*

USE CATEGORIES

Use category	Uses
apotropaic	cleansing (incense)
	prevention (incense)
	protection (incense)
cardiovascular	anti arrhythmic
	blood circulation
	cardio-tonic
	hypertonic
	nervous heart
	venous disease (internal application)
	warming
dermatological	blistering ointment
	burnings, sun burn
	disinfectant (top. application)
	gangrene
	hair care
	insect bites
	mycosis (skin)
	nose bleeding
	oral herpes
	skin care, facial lotion
	skin diseases
	sour throat (top. application)
	superficial injuries
	sweating
	varices (top. application)
	wounds, wound healing, ulcus cruris
detoxification	body cleansing
	catharsis
	encourage metabolism
	lymphatic system
	purgative
	purging

ears	otitis
eyes	eye infection
	eye tonic
fever	fever, antifebrile
gastrointestinal	bitter drug
	diarrhoea
	digestion
	laxative
	liver
	nausea
	orexigenic
	sickness
	spice (digestive)
	stomachache
gynaecological	antispasmodic (menstruation)
	climacteric
	easing childbirth
	hormone balance
	menstruation
	premenstrual syndrome
	women's health
nervous system	ADHS (children)
	analgesic (general)
	antispasmodic (general)
	calming nerves
	coffee substitute
	concentration
	depression
	headache
	migraine
	relaxation
	shock
	sleeping problems
	"soul"

respiratory	respiratory tract
	common cold
	sour throat
	hay fever
	cough
skeletomuscular	arteriosclerosis
	blunt traumas
	contusion
	gout
	joint pain
	massage
	muscle pain
	musculoskeletal system
	sporting injury
	stimulating the blood flow
teeth	toothache
tonic	tonic (general)
	immune system
	healthy food, wild food
	mineral substances and vitamins
	prevention
	convalescence
	fatigue
urological	diuretic
	bladder
	kidney
	men's health
	prostate gland
other	cancer
	haemostatic
	homeopathic preparations without specific indication
	infection (Lyme disease)
	ornamental (colour, flavour)
	panacea, favourite plant
	thyroid gland
	veterinary (parasite infestation)

MEDICINAL PLANTS USED BY HERBALISTS IN SWITZERLAND.

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Abies alba MLL. Pinaceae	Tanne, Weisstanne	ind.	tree	forest	collected	sprouts, resin, esseintial oil	**top.** essential oil, ointment: relaxation (massage), common cold	3	mon
Achillea erba-rotta ALL. ssp. *moschata* (WULFEN) VACC. Asteraceae	Iva	ind.	herb	mount.	collected	leaves, flowers	**syst.** infusion (mixture): digestion	2	con
Achillea millefolium agg. Asteraceae	Schafgarbe	ind.	herb	fert. mead.	collected, bought	leaves, flowers	**syst.** infusion (18): digestion, womens health **top.** compresse (2): liver, digestion **vol.** incense (mixture) (1): cleansing	21	ant
Aconitum napellus agg. Ranunculaceae	Eisenhut	ind.	herb	wet mead., mount.	bought	subt. parts	**syst.** homoeopathic prep.: -	2	ant
Acorus calamus L. Acoraceae	Kalmus	neo.	herb	marsh	bought	subt. parts	**syst.** tincture: digestion	2	ant
Actaea racemosa L. (syn. *Cimicifuga racemosa* L.*)* Ranunculaceae	Cimicifuga, Traubensilberkerze	exot.	herb	cult.	bought	subt. parts	**syst.** phytopharmaceutical, tincture (3): women's health, premenstrual syndrome; ointment (1): childbirth pain	4	con
Adonis vernalis L. Ranunculaceae	Adonis Rösli	ind.	herb	dry mead.	bought	leaves, flowers	**syst.** tincture: heart problems	2	ren
Aegopodium podagraria L. Apiaceae	Baumtropfen, Giersch	ind.	herb	forest	collected	young leaves	**syst.** wild vegetable (fresh), tincture (3): detoxification in spring **top.** cataplasm (1): joint pain	4	ren
Aesculus hippocastanum L. Sapindaceae	Rosskastanie	neo.	tree	forest	bought	seeds (testa)	**syst.** tincture: venous diseases	2	con
Agrimonia eupatoria L.	Odermennig	ind.	herb	forest	collected,	leaves	**syst.** infusion: liver	3	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Rosaceae					bought				
Ajuga reptans L. Lamiaceae	Günsel	ind.	herb	fert. mead.	collected	flowers, leaves	**syst.** wild vegetabel (fresh): detoxification in spring	1	ren
Alcea rosea L. Malvaceae	Stockrose	ind., neo.	herb	wayside, cult.	collected	flowers	**syst.** infusion: ornamental, colour	1	ren
Alchemilla alpina agg.; *A. conjuncta* agg. Rosaceae	Silbermänteli	ind.	herb	mount.	collected	leaves	**syst.** infusion (single, mixture): women's health	3	con
Alchemilla vulgaris agg. Rosaceae	Frauenmänteli	ind.	herb	mead.	collected, bought	leaves	**syst.** infusion (single, mixture), tincture (12): women's health ointment (1): childbirth pains	13	ren
Alliaria petiolata (M. BIEB.) CAVARA et GRANDE Brassicaceae	Knoblauchhederich, Knoblauchrauke	ind.	herb	forest, ruderal	collected	leaves	**syst.** wild vegetable (fresh): detoxification in spring	1	ren
Allium cepa L. Amaryllidaceae	Zwiebel	arch.	herb	ruderal	collected, bought	bulb	**syst.** sirup (2): cough **top.** compresse (7): common cold, eareache	9	ant
Allium sativum L. Amaryllidaceae	Knoblauch	arch.	herb	ruderal	collected	clove (bulb)	**syst.** spice (4): bloodpressure	5	ant
Allium ursinum L. Amaryllidaceae	Bärlauch	ind.	herb	forest	collected	leaves	**syst.** spice, wild vegetable (fresh): detoxification in spring	3	mon
Aloe vera (L.) BURM.F. (syn. *Aloe barbadensis* MILL.) Xanthorrhoeaceae	Aloe	exot.	shrub	dry zones	collected	leaf juice	**syst.** juice (1): purgative; cosmetics (1): skin care	2	ant
Aloysia citriodora PALAU Verbenaceae	Verbena, Verveine	exot.	shrub	cult.	collected	leaves	**syst.** infusion: relaxation, digestion	3	con
Althaea officinalis L. Malvaceae	Eibisch	neo.	herb	ruderal	collected	subt. parts	**syst.** infusion: cough	3	ant
Anethum graveolens L.	Dill	arch.	herb	cult.	collected	leaves	**syst.** spice: digestion	1	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Apiaceae									
Angelica archangelica L.; A. *sylvestris* L. Apiaceae	Engelwurz	ind., neo.	herb	cult., woods	collected, bought	subt. parts	**syst.** tincture (5),: digestion, **vol.** incense (2): protection (apotropaic)	9	mon
Angelica sinensis (OLIV.) DIELS Apiaceae	Chinesische Engelwurz	exot.	herb	woods	bought	subt. parts	**syst.** infusion: women's health	1	con
Antennaria dioica (L.) GAERTN. Asteraceae	Katzenpfötchen	ind.	herb	mount.	collected	flowers	**syst.** infusion (mixture): ornamental	1	ren
Anthriscus cerefolium (L.) HOFFM. Apiaceae	Gartenkerbel	arch.	herb	cult.	collected	leaves	**syst.** spice: digestion	1	mon
Anthyllis vulneraria L. Fabaceae	Wundklee	ind.	herb	dry mead.	collected	flowers	**top.** ointment: substitute for *Calendula officinalis*	1	con
Apium graveolens L. Apiaceae	Sellerie	arch.	herb	ruderal, weed, cult.	collected	leaves	**syst.** spice : digestion	1	mon
Aquilegia vulgaris agg. Ranunculaceae	Akelei	ind., neo.	herb	forest	collected	whole plant	**syst.** homeopathic prep: -	1	mon
Arctium lappa L. Asteraceae	Grosse Klette	ind., arch.	herb	wayside	collected	subt. parts	**syst.** infusion: liver	2	ant
Arctostaphylos uva-ursi (L.) SPRENG. Ericaceae	Bärentraube	ind.	dwarf shrub	forest	collected, bought	leaves	**syst.** infusion: diuretic	4	con
Aristolochia clematitis L. Aristolochiaceae	Osterluzei	ind., arch.	herb	woods	collected	fresh leaves	**top.** wound dressing: „open legs" (ulcus cruris)	1	mon
Armoracia rusticana P. GAERTN., B.MEY. & SCHERB. Brassicaceae	Meerrettich	arch.	herb	cult.	collected	fresh subt. parts	**syst.** wine, spice: immune system	3	mon
Arnica montana L. Asteraceae	Arnika	ind.	herb	mount.	bought	subt. parts, whole plant	**syst.** homeopathic prep. (4): injuries **top.** tincture, ointment (11): injuries;	15	mon

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Artemisia abrotanum L. Asteraceae	Eberraute	arch.	dwarf shrub	cult.	collected	leaves	**syst.** infusion: coffee substitute	2	ant
Artemisia absinthium L. Asteraceae	Wermut	ind., arch.	herb	cult.	collected, bought	leaves	**syst.** tincture, tinsane: digestion, liver	8	ant
Artemisia dracunculus L. Asteraceae	Estragon	arch.	herb	cult.	collected	leaves	**syst.** spice: digestion	2	mon
Artemisia genipi WEBER EX STECHM. Asteraceae	Edelraute	ind.	herb	mount.	collected	herb	**syst.** tincture, schnaps: digestion	1[1)]	mon
Artemisia vulgaris agg. Asteraceae	Beifuss	ind.,arch., neo.	herb	wayside	collected	leaves, flowers	**syst.** infusion (5): digestion, detoxification **vol.** (3): incense apotropaic, moxa	9	mon
Asarum europaeum L. Aristolochiaceae	Haselwurz	ind.	herb	forest	bought	sub. parts	**syst.** homeopathic, anthroposophic prep.: -	1	ant
Asplenium scolopendrium (L.) NEWMAN (syn. *Phyllitis scolopendrium* (L.) NEWMAN) Aspleniaceae	Hirschzungenfarn	ind.	herb	forest, ravines	bought	leaves	**syst.** tincture	1	ren
Atropa belladonna L. Solanaceae	Tollkirsche	ind.	herb	forest	bought	fresh plant	**syst.** homeopathic prep: -	2	ant
Avena sativa L. Poaceae	Hafer	arch.	herb	cult.	bought	leaves, straw	**syst.** tincture, infusion: tonic, burnout	2	ant
Bambusa sp. Poaceae	Bambus	exot.	shrub	cult.	bought	leaves	**syst.** infusion: general health effect	1	con
Bellis perennis L. Asteraceae	Geissenblümchen, Gänseblümchen	ind.	herb	mead.	collected	flowers	**syst.** tincture (1): skin diseases face lotion (1): skin care	2	ren
Berberis aquifolium PURSH (syn. *Mahonia aquifolium* (PURSH) NUTT.) Berberidaceae	Mahonie	neo.	shrub	forest	collected	leaves	**syst.** homeopathic prep.: -	1	con

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Berberis vulgaris L. Berberidaceae	Berberitze	ind.	shrub	forest	bought	fruits, bark	**syst.** infusion: detoxification; homeopathic prep.: -	3	mon
Betula alba agg. Betualceae	Birke	ind.	tree	marsh, moor	collected, bought	leaves	**syst.** infusion, tincture: diuretic	5	mon
Borago officinalis L. Boraginaceae	Borretsch	neo.	herb	ruderal, weed, cult.	collected	leaves, flowers	**syst.** infusion, spice	1	mon
Boswellia sacra FLUECK Burseraceae	Weihrauch	exot.	shrub	dry zones	bought	subt. parts	**syst.** phytopharmaceutical, tincture (4): pain-reliesing (analgesic) **top.** ointment (1): pain-reliesing	5	ant
Brassica nigra (L.) K.KOCH; *Sinapis alba* L. Brassicaceae	Senf	arch.	herb	ruderal, weed, cult.	bought	seeds	**syst.** spice (1): digestion **top.** footbath (3): common cold; hot compress (1): joint pain	5	ant
Brassica oleracea L. Brassicaceae	Kohl	ind., arch.	herb	cult.	collected	leaves	**top.** compress: joint pain	1	ant
Calendula officinalis L. Asteraceae	Ringelblume	arch.	herb	cult.	collected, bought	flowers	**syst.** infusion (mixture) (6): ornamental drug tincture, ointment (13): skin care, wound healing	19	mon
Calluna vulgaris (L.) HULL Ericaceae	Heidekraut, Erika	ind.	dwarf shrub	forest	collected	leaves, flowers	**syst.** infusion	1	ren
Cannabis sativa L. Cannabaceae	Hanf	arch.	herb	cult., ruderal, weed	bought	leaves, flowers	**syst.** homeopathic prep.(2): analgesic, relaxant **top.** oil massage (2): analgesic **vol.** (1): incense, relaxant	5	ant
Capsella bursa-pastoris (L.) MEDIK. Brassicaceae	Hirtentäschli	ind., arch.	herb	weed, ruderal	collected	leaves, flowers	**syst.** tincture, infusion (5): lesion , hemostatic dryed herb in bursa (1): antispasconic	6	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Capsicum annuum L. Solanaceae	Chillie, Spanischer Pfeffer	neo	herb	cult	bought	seeds	**top.** patch: sport injuries	2	con
Cardiospermum halicacabum L. Sapindaceae	Cardiospermum	exot.	herb	cult.	bought	fresh plant	**syst.** homeopathic prep., ointment: skin diseases	1	con
Carum carvi L. Apiaceae	Kümmel, Wiesenkümmel	ind.	herb	fert. mead.	collected	fruits	**syst.** spice, infusion: digestion	3	ant
Castanea sativa MILL. Fagaceae	Kastanie	arch.	tree	forest	collected	leaves	**syst.** infusion, tincture: adstringent	1	ant
Centaurea benedicta (L.) L. (syn. *Cnicus benedictus* L.) Asteraceae	Kardobenedikte	arch.	herb	weed, ruderal	bought	leaves, flowers	**syst.** infusion: detoxification	1	mon
Centaurium erythraea RAFN Gentianaceae	Tausendgüldenkraut	ind.	herb	woods	collected, bought	leaves, flowers	**syst.** infusion, tincture: bitterdrug, digestion, detoxification	4	ant
Cetraria islandica (L.) ACH. Parmeliaceae	Isländisch Moos	ind.	lichen	marsh, moor	collected, bought	leaves	**syst.** infusion, lozenge: cough	2	con
Chelidonium majus L. Papaveraceae	Schöllkraut	ind., arch.	herb	weed, ruderal, woods	collected	latex, leaves, flowers	**top.** leaves in hand- and footbath (1) : tonic direct application of latex on warts (2)	3	ant
Chenopodium bonus-henricus L. Amaranthaceae	Guter Heinrich	ind.	herb	pastures	collected	leaves	**syst.** wild vegetable (spinach)	1	ren
Chrysosplenium alternifolium L.; *Chrysosplenium oppositifolium* L. Saxifragaceae	Milzkraut	ind.	herb	forest	bought	leaves, flowers	**syst**. anthroposophic prep.	1	con
Cichorium intybus L. Asteraceae	Wegwarte	arch.	herb	wayside, ruderal	collected	subt. parts	**syst.** infusion: detoxification, liver	3	ant
Cinnamomum verum J. PRESL. Lauraceae	Zimt	exot.	tree	cult.	bought	bark	**syst.** infusion, spice: warming, digestion	2	ant
Cirsium arvense (L.) SCOP.	Ackerdistel	ind.	herb	wayside,	collected	leaves	**syst.** wild vegetable	1	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Asteraceae				pastures					
Citrus x *aurantium* L. Rutaceae	Orange	exot.	tree	cult.	bought	flowers	**syst.** infusion: nerves, relaxation, sleep	5	mon
Coriandrum sativum L. Apiaceae	Koriander	arch.	herb	cult.	collected	fruits	**syst.** spice: digestion	4	ant
Cornus mas L. Cornaceae	Kornelkirsche, Tierlibaum	ind., neo.	shrub, tree	forest	collected	fruits	**syst.** fruit, pulp: Vit. C supply	1	ant
Corylus avellana L. Betualceae	Haselnuss	ind.	shrub, tree	forest	collected	Leaves, nuts	**syst.** infusion (leaves) (1): detoxification nuts: tonic	2	ant
Crataegus monogyna JACQ.; *C. laevigata* (POIRET) DC. Rosaceae	Weissdorn	ind.	shrub, tree	woods	collected, bought	fruits, flowers, leaves	**syst.** infusion, tincture: heart tonic	10	mon
Cucurbita pepo L. Cucurbitaceae	Kürbis	neo.	vine	cult.	bought	seeds	**syst.** phytopharmaceutical: urological diseases	1	ant
Cyanus segetum HILL*; Cyanus montanus* (L.) HILL (syn. *Centaurea cyanus* L.; *C. montana* L.) Asteraceae	Kornblume, Flockenblume	ind., arch.	herb	cult., fields	collected	flowers	syst. infusion (mixture): ornamental drug	2	ren
Cydonia oblonga MILL. Rosaceae	Quitte	arch.	tree	cult.	collected	fruits	**syst.** sirup: general strengthening, tonic	3	ant
Cynara cardunculus L. Asteraceae	Artischocke	arch.	herb	cult.	bought	leaves	**syst.** tincture: digestion, liver	4	ant
Daucus carota L. Apiaceae	Wilde Möhre	arch.	herb	wayside, ruderal	bought	subt.parts	**syst.** tincture: concentration	4	ant
Dioscorea sp. Dioscoreaceae	Yams	exot.	herb	cult.	bought	subt. parts	**syst.** tincture: women's health, climacteric problems	2	con
Dipsacus fullonum L.	Karde	arch.	herb	weed,	bought	subt. parts	**syst.** tincture: borreliosis	4	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Caprifoliaceae				ruderal,					
Drosera rotundifolia L. Droseraceae	Sonnentau	ind.	herb	marsh	bought	subt. parts , leaves, flowers	**syst.** phytopharmaceutical, homeopathic prep.: cough	2	con
Dryopteris filix-mas (L.) SCHOTT Dryopteridaceae	Wurmfarn	ind.	fern	forest	collected	leaves	**syst.** infusion, tincture: gynaecological and urological diseases	2	mon
Echinacea purpurea (L.) MOENCH; *Echinacea pallida* (NUTT.) NUTT. Asteraceae	Sonnenhut, Echinacea	neo.	herb	cult.	bought	subt. parts, leaves, flowers	**syst.** tincture, pastills, homeopathic prep.: immune system, cold	14	con
Elaeagnus rhamnoides (L.) A.NELSON (syn. *Hippophaë rhamnoides*) Elaeagnaceae	Sanddorn	ind.	shrub, tree	riverside, alluvial	collected, bought	fruits	**syst.** juice: immun defence **top.** seed oil: skin care	3	con
Eleutherococcus senticosus (RUPR. & MAXIM.) MAXIM. Araliaceae	Taigawurzel	exot.	shrub	woods	bought	subt. parts	**syst.** phytopharmaceutical: tonic, stress diseases	1	con
Elymus repens (L.) GOULD Poaceae	Quecke	ind.	herb	ruderal, weed	collected	subt. parts	**syst.** infusion: diuretic	1	con
Ephedra distachya L. Ephedraceae	Meerträubchen	ind.	herb	rocky, mural	bought	leaves	**syst.** phytopharmaceutical: asthma	1	ant
Epilobium angustifolium L.; *E. fleischeri* HOCHST., *E. parviflorum* SCHREB. Onagraceae	Weidenröschen	ind.	herb	marsh	collected, bought	leaves, flowers, sprouts	**syst.** infusion: urological (men's health); wild vegetable (sprouts): healthy food	2	con
Equisetum arvense L. Equisetaceae	Ackerschachtelhalm	ind.	herb	wayside, alluvion	collected, bought	leaves	**syst.** infusion (10): diuretic, connecting tissues **top.** bath (1): skin and hair care	11	mon
Eucalyptus globulus LABILL. Myrtaceae	Eucalyptus	exot.	tree	cult.	bought	essential oil	**top.** bath: common cold	1	con
Eupatorium cannabinum L. Asteraceae	Wasserdost	ind.	herb	riverside, wet forest	collected	leaves, flowers	**syst.** infusion: immune system	1	ren

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Euphrasia rostkoviana agg. Orobanchaceae	Augentrost	ind.	herb	leaves, flowers	collected, bought	leaves, flowers	**syst.** infusion, homeopathic prep. (2): conjunctivitis **top.** eyedrops (2): conjunctivitis	4	ren
Ficus carica L. Moraceae	Feige	ind., neo.	tree	cult.	bought	fruits	**syst.** juice: digestion, mild laxtive	1	ant
Filipendula ulmaria (L.) MAXIM. Rosaceae	Mädesüss	ind.	herb	marsh	collected	flowers	**syst.** infusion (5): antipyretic **top.** essential oil (1): aching muscles	6	ren
Foeniculum vulgare MILL. Apiaceae	Fenchel	ind., arch.	herb	cult.	collected, bought	seeds	**syst.** infusion (7): digestion **top.** massage (1): abdominal pain	8	ant
Fragaria vesca L. Rosaceae	Erdbeere	ind.	herb	forest	collected	leaves	**syst.** infusion (mixture)	2	mon
Frangula alnus MILL. Rhamnaceae	Faulbaum	ind.	shrub, tree	forest	bought	cortex	**syst.** sirup: laxative	2	mon
Fraxinus excelsior L. Oleaceae	Esche	ind.	tree	forest	collected, bought	leaves	**syst.** tincture, infusion: antirheumatic	2	mon
Fumaria officinalis L. Papaveraceae	Erdrauch	arch., neo.	herb	fields, wasteland	bought	leaves, flowers	**syst.** tincture: relaxation, nerves	3	ant
Galega officinalis L. Fabaceae	Geissraute	neo.	herb	forest, cult.	collected	leaves	**syst.** infusion: lactation in confinement	1	ren
Galeopsis ladanum agg. Lamiaceae	Hohlzahn	ind., arch.	herb	weed	collected	leaves, flowers	**syst.** infusion: cold	1	con
Galium odoratum (L.) Scop. Rubiaceae	Waldmeister	ind.	herb	forest	collected	leaves	**syst.** infusion (mixture)	3	con
Galium verum L.; *G. mollugo* L. Rubiaceae	Echtes Labkraut, Gewöhnliches Wiesenlabkraut	ind.	herb	dry, wet mead.	collected	leaves, flowers	**syst.** infusion: relaxant **vol.** cussion: relaxant	5	ant
Gentiana lutea L.	Gelber Enzian	ind.	herb	alpine	bought	subt. parts	**syst.** tincture: digestion, liver	3	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Gentianaceae				pastures					
Geranium robertianum L. Geraniaceae	(Stinkender) Storchenschnabel	ind., neo.	herb	woods	collected, bought	leaves, flowers	**syst.** tincture (11): nerves, emergency remedy (shock), detoxification, lymphatic system **top.** tincture (2): insect bites	13	mon
Geum urbanum L. Rosaceae	Nelkenwurz	ind., neo.	herb	woods	collected	subt. parts	**syst.** roots (chewed): tonic	1	ren
Ginkgo biloba L. Ginkgoaceae	Ginkgo	exot.	tree	cult.	bought	leaves	**syst.** phytopharmaceutical: brain tonic	1	con
Glechoma hederacea agg. Lamiaceae	Gundelrebe, Gundermann	ind.	herb	mead., woods	collected, bought	leaves, flowers	**syst.** tincture: cough; wild vegetable (fresh) (mixture): purification	5	mon
Glycyrrhiza glabra L. Fabaceae	Süssholz	arch.	herb	cult.	bought	subt. parts	**syst.** infusion (mixture): sweetening, cough	3	ant
Hamamelis virginiana L. Hamamelidaceae	Hamamelis	exot.	shrub	cult.	bought	bark, leaves	**top.** infusion, tincture: skin care, skin diseases, varicose veines	1	con
Harpagophytum procumbens (BURCH.) DC. ex MEISN. Pedaliaceae	Teufelskralle	exot.	herb	dry zones	bought	subt. parts	**syst.** phytopharmaceutical: rheumatic diseases, arthrosis	3	con
Hedera helix L. Araliaceae	Efeu	ind.	tree	forest	bought	leaves	**syst.** phytopharmaceutical: cough	4	ant
Humulus lupulus L. Cannabaceae	Hopfen	ind., neo.	herb	forest	collected, bought	cones	**syst.** infusion: relaxation, calming, sleeping problems	7	mon
Hyoscyamus niger L. Solanaceae	Bilsenkraut	ind., arch.	herb	wayside, wasteland	bought	leaves	**top.** oil: analgesic	2	ant
Hypericum perforatum L. Hypericaceae	Johanniskraut	ind.	herb	dry mead., woods	collected, bought	flowers, shoot tip	**syst.** infusion, tincture, phytopharmaceutical (11): depression **top.** oil (17): wounds, burns, joint pain	28	ant
Hyssopus officinalis L.	Ysop	ind., arch.	herb	cult.	collected	leaves, flowers	**syst.** infusion, spice	1	mon

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Lamiaceae									
Ilex aquifolium L. Aquifoliaceae	Stechpalme	ind.	shrub, tree	forest	collected	leaves	**syst.** infusion: cough	1	con
Impatiens glandulifera ROYLE Balsaminaceae	Springkraut (rotes)	neo.	herb	riverside, alluvial	bought	flowers	**syst**. Bach-Flower-Tincture (Impatiens): -	1	con
Inula helenium L. Asteraceae	Alant	ind., arch.	herb	cult.	collected	subt. parts	**vol.** incense: protection, cleansing	3	ant
Iris germanica agg. Iridaceae	Iris, Schwerlilie	neo.	herb	cult.	bought	subt. parts	**top.** cosmetics: skin care	2	ant
Isatis tinctoria L. Brassicaceae	Färberwaid	ind.	herb	wasteland	bought	-	**syst.** tincture	1	ant
Juglans regia L. Juglandaceae	Nussbaum, Walnuss	arch.	tree	cult.	collected	nuts, oil, leaves	**syst.** nuts: brain tonic (2) **top.** bath (leaves) (1): skin diseases	3	ant
Juniperus communis L. Cupressaceae	Wacholder	ind.	herb	woods	collected, bought	fruits, leaves	**syst.** infusion (6): to support kidney **vol.** burn incense (1)	7	ant
Lamium album L. Lamiaceae	Weisse Taubnessel	ind., arch.	herb	woods	collected	leaves, flowers	**syst.** infusion: women's health	1	mon
Larix decidua MILL. Pinaceae	Lärche	ind., neo.	tree	forest	collected	resin	**top.** essential oil: respiratory **vol.** burn incense (1)	2	ant
Laurus nobilis L. Lauraceae	Lorbeer	arch.	shrub, tree	cult.	collected	leaves	**syst.** spice: digestion	1	ant
Lavandula angustifolia MILL. Lamiaceae	Lavendel	ind., neo.	herb	cult.	collected, bought	flowers	**syst.** infusion (8): relaxation, ornamental drug **top.** essential oil (13): relaxation (massage), skin care **vol.** sented sachet, cushion (1): nerves, sleeping problems	22	mon
Leontopodium nivale (TEN.) HUET EX HAND.-MAZZ *(*syn. *Leontopodium*	Edelweiss	ind.	herb	mount.	collected	leaves, flowers	**syst.** infusion: digestion	1	ren

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
alpinum CASS.) Asteraceae									
Leonurus cardiaca agg. Lamiaceae	Herzgespann	ind., neo.	herb	wayside, wasteland	collected	leaves	**syst.** infusion, tincture: nervous heart complaint, menopausal disorders	3	ren
Lepidium latifolium L. Brassicaceae	Kresse	arch.	herb	cult.	collected	leaves	**syst.** tincture: cough, „herbal-antibiotic“	1	mon
Levisticum officinale W.D.J.KOCH Apiaceae	Liebstöckel, Maggikraut	arch.	herb	cult.	collected	Leaves, stalks	**syst.** spice: digestion	1	ant
Ligusticum mutellina (L.) CRANTZ Apiaceae	Muttern	ind.	herb	mead., past.	collected	leaves, flowers	**syst.** infusion: digestion, cough	1	mon
Linum usitatissimum L. Linaceae	Lein	ind.	herb	cult.	bought	seeds	**syst.** whole seeds: digestion	1	ant
Lotus corniculatus L. Fabaceae	Hornklee	ind., neo.	herb	fert. mead.	collected	leaves, flowers	**syst.** infusion: ornamental veterinary parasite infestation	2	ren
Lythrum salicaria L. Lythraceae	Blutweiderich	ind.	herb	marsh	collected	leaves, flowers	**syst.** infusion	1	ant
Malus sylvestris (L.) MILL Rosaceae	Apfel	ind.	tree	cult.	collected	fruits skin	**syst.** infusion	1	ant
Malva parviflora agg.; *M. sylvestris* agg. Malvaceae	Käslikraut, Malve	ind., arch.	herb	wayside	collected	leaves, flowers	**syst.** infusion (12): cough; **top.** bath (1): wounds, skin care	13	ant
Mandragora officinalis MILL. Solanaceae	Alraune	ind., arch.	herb	wayside	bought	subt. parts	**top.** oil, ointment: analgesic	1	ant
Marrubium vulgare L. Lamiaceae	Andorn	arch.	herb	cult.	collected	leaves, flowers	**syst.** infusion (bitterdrug): cough, digestion	2	ant
Matricaria chamomilla L. Asteraceae	Kamille	ind., arch.	herb	cult., fields	collected, bought	flowers	**syst.** infusion (14): stomachache, nerves **vol.** sachet, cushion (2): nerves, sleeping problems esp. children	16	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Melilotus officinalis (L.) PALL.; *M. albus* MEDIK. Fabaceae	Steinklee (gelber oder weisser)	arch., neo.	herb	wayside, wasteland	collected	leaves, flowers	**syst.** infusion, tincture (2): blood tinning, nerves **vol.** scented sachet, cushion (1): nerves, sleeping problems	3	ren
Melissa officinalis L. Lamiaceae	Zitronenmelisse, Melisse	arch., neo.	herb	cult.	collected, bought	leaves	**syst.** infusion (13): calming nerves, digestion **top.** essential oil (10): herpes labialis, relaxation (massage)	23	ant
Mentha spicata agg. Lamiaceae	Minze, Pfefferminze	ind.	herb	cult.	collected, bought	leaves	**syst.** infusion (13): digestion **top.** essential oil (3): headache	16	ant
Monarda didyma L. Lamiaceae	Goldnessel	exot.	herb	cult.	collected	flowers	**syst.** infusion: women's diseases, nerves	4	con
Myrrhis odorata (L.) SCOP. Apiaceae	Süssdolde	ind., neo.	herb	cult.	collected	leaves	**syst.** infusion: sweetening	1	ant
Nasturtium officinale R.BR.. Brassicaceae	Brunnenkresse	ind.	herb	creek, wet habitats	bought	leaves	**syst.** wild spring salade: general purification, detoxification	2	ant
Ocimum basilicum L. Lamiaceae	Basilikum	arch.	herb	cult.	collected	leaves	**syst.** infusion, spice	3	ant
Oenothera biennis agg. Onagraceae	Nachtkerze	neo.	herb	wayside, wasteland	bought	seeds	**syst.** fat oil (1): food supplement **top.** fat oil (1): skin care	2	con
Okoubaka aubrevillei PELLEGR. & NORMAND *Santalaceae*	Oukubaka	exot.	shrub	tropical forest	bought	bark	**syst.** homeopathic prep.: travellers diarrhoea, detoxification	1	-
Olea europaea L. Oleaceae	Olive	arch.	tree	cult.	bought	fruits	**syst.** fat oil: neutral massage oil, ointment	1	ant
Ononis spinosa agg. Fabaceae	Hauhechel	ind.	herb	dry mead., pastures	bought	subt. parts	**syst.** infusion: diuretic, kidney problems, gout	2	ren
Origanum majorana L. Lamiaceae	Origano	arch.	herb	cult.	collected	leaves, flowers	**syst.** infusion: digestion, cold; spice	3	mon

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Origanum vulgare L. Lamiaceae	Dost	ind.	herb	cult., woods	collected	leaves, flowers	**syst.** infusion (7): digestion, women's health; **top.** ointment (2): „nose-butter"	9	ant
Orthosiphon sp. Lamiaceae	Indischer Nierentee	exot.	herb	cult.	bought	leaves, flowers	**syst.** infusion: diuretic	1	con
Oxalis acetosella L. Oxalidaceae	Sauerklee	ind.	herb	forest	collected	leaves, flowers	**syst.** homeopathic prep. (dilution): antispasmodic	1	mon
Paeonia sp. Paeoniaceae	Pfingstrose	ind.	herb	cult.	collected	flowers	**syst.** infusion: ornamental	1	ant
Panax ginseng C.A. MEY. Araliaceae	Ginseng	exot.	herb	woods	bought	subt. parts	**syst.** phytopharmaceutical: tonic	2	con
Papaver rhoeas L. Papaveraceae	Klatschmohn	arch.	herb	fields, wasteland	collected	flowers	**syst.** infusion: ornamental	1	ant
Papaver somniferum L. Papaveraceae	Schlafmohn	arch.	herb	cult.	bought	latex	**syst.** tincture (mixture): cough, relaxant	2	ant
Paris quadrifolia L. Melanthiaceae	Einbeere	ind.	herb	woods	collected	leaves	**top.** ointment, tincture: tonic	2	ren
Passiflora edulis SIMS Passifloraceae *(*syn. *Passiflora incarnata* L.*)* Passifloraceae	Passionsblume	exot.	liana	cult.	bought	leaves	**syst.** infusion, tincture: nerves, adiseases, sedation	3	con
Petasites hybridus (L.) G.GAERTN., B.MEY. & SCHERB. Asteraceae	Pestwurz	ind.	herb	marsh	bought	leaves, subt. parts	**syst.** phytopharmaceutical, tincture: antispasconic	1	ant
Petroselinum crispum (MILL.) FUSS Apiaceae	Peterli, Petersilie	arch.	herb	cult.	collected	leaves	**syst.** spice: general vitalisation	1	ant
Peucedanum ostruthium (L.) W.D.J.KOCH Apiaceae	Meisterwurz	ind., neo.	herb	wet mead.	collected, bought	subt. parts	**syst.** tincture (3): digestion, food intoxication **top.** bath (3): wound infection, injuries,	7	mon

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
							teeth ache **vol.** incense (1)**:** apotropaic		
Phaseolus vulgaris L. Fabaceae	Gartenbohne	neo.	herb	cult.	collected	pod	**syst.** infusion: mild diuretic	1	ant
Picea abies (L.) H.KARST. Pinaceae	Fichte, Rottanne, Tanne	ind., neo.	tree	forest	collected	sprouts	**syst.** infusion, honey: common cold, cough **top.** resin, essential oil: relaxation (massage); ointment: relaxation, common cold	5	mon
Pimpinella anisum L. Apiaceae	Anis	arch.	herb	cult.	bought	fruits	**syst.** infusion: digestion, cough	2	ant
Pinguicula sp. Lentibulariaceae	Fettkraut	ind.	herb	wet mead.	bought	leaves, flowers	**syst.** tincture (mixture): cough	1	con
Pinus mugo TURRA Pinaceae	Legföhre	ind.	shrub, tree	forest (mount.)	bought	essential oil	**top.** ointment: cold; massage-oil: muscle pain	3	con
Pinus sylvestris L. Pinaceae	Föhre	ind., neo.	tree	forest	bought	sprouts	**syst.** infusion (mixture): cough	1	mon
Piper methysticum G.FORST Piperaceae	Kava Kava	exot.	shrub	cult.	bought	n.d.	**syst.** tincture: relaxation	1	con
Plantago alpina L. Plantaginaceae	Alpenwegerich	ind., neo.	herb	mead.	collected	leaves	**syst.** infusion (mixture): cough	1	con
Plantago lanceolata L. Plantaginaceae	Spitzwegerich	ind.	herb	mead.	collected	leaves	**syst.** infusion (mixture) (8): cough **top.** fresh leaveas (3): insect bite	11	mon
Plantago major L. Plantaginaceae	Breitwegerich	ind.	herb	wayside, wasteland	collected	leaves	**top.** fresh leaveas: insect bite	1	mon
Plantago ovata FORSSK. Plantaginaceae	Flohsamen	exot.	herb	wayside	bought	seeds	**syst.** seeds: digestion, constipation	2	ant
Polygonum aviculare agg. Polygonaceae	Vogelknöterich	ind., neo.	herb	wayside, wasteland	collected	subt. parts	**syst.** tincture: cough	1	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Potentilla anserina L. Rosaceae	Gänsefingerkraut	ind.	herb	wayside, wet mead.	collected	leaves	**syst.** infusion: relaxation	4	mon
Potentilla erecta (L.) RAEUSCH. Rosaceae	Blutwurz, Tormentill	ind.	herb	mead.	collected	subt. parts	**syst.** tincture (4):travel prevention (diarrhoea) **top.** pouder (1): skin care (prevention of pressure sores)	5	mon
Primula elatior (L.) HILL; *P. veris* L. Primulaceae	Schlüsselblume	ind.	herb	woods, dry mead.	collected	flowers	**syst.** infusion (mixture): cough	3	ren
Prunella vulgaris L. Lamiaceae	Braunelle	ind.	herb	forest	collected	leaves, flowers	**syst.** infusion: anti cancer	2	ren
Prunus avium L. Rosaceae	Chriesi, Kirschen	ind.	tree	forest	collected	fruit stalks	**syst.** infusion (mixture): -	1	ant
Prunus domestica L. Rosaceae	Pflaume	arch.	tree	cult.	bought	fruits	**syst.** juice: constipation	1	ant
Prunus dulcis (MILL.) D.A.WEBB. Rosaceae	Mandel	arch.	shrub, tree	cult.	bought	seeds	**top.** fat oil: skin care, massage oil	1	ant
Prunus spinosa L. Rosaceae	Schlehdorn, Schlehe	ind.	shrub	forest	collected	flowers, leaves	**syst.** infusion (mixture): tonic	2	ant
Pulmonaria officinalis agg. Boraginaceae	Lungenkraut	ind., arch., neo.	herb	woods, forest	collected	leaves, flowers	**syst.** infusion: cough	2	mon
Punica granatum L. Lythraceae	Granatapfel	arch.	shrub	cult.	bought	seeds	**top.** fat oil: skin care	2	ant
Quercus robur agg. Fagaceae	Eiche	ind.	tree	forest	bought	bark	**top.** tincture, decoct: skin care, wound healing	3	ant
Raphanus raphanistrum L. (syn. *Raphanus sativus* L.) Brassicaceae	Rettich	arch.	herb	cult.	collected	subt. parts	**syst.** sirup (with sugar): cough	1	ant
Rauvolfia serpentina (L.) BENTH. EX KURZ	Indische Schlangenwurzel	exot.	shrub	woods	bought	subt. parts	**syst.** tincture: bloopressure, athmosphere	1	con

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Apocynaceae							releated syndrom		
Rhamnus cathartica L. Rhamnaceae	Kreuzdorn	ind.	shrub, tree	forest	collected	branches	**other** hang in stable: protection, support healing	1	mon
Rheum spp. Polygonaceae	Medizinalrhabarber	exot.	herb	mount., cult.	bought	subt. parts	**syst.** infusion: constipation	1	ren
Rhododendron ferrugineum L.; *R. hirsutum* L. Ericaceae	Alpenrose	ind.	herb	mount.	collected	flowers	**syst.** infusion (mixture): -	1	ren
Ribes nigrum L. Grossulariaceae	Cassis, Schwarze Johannisbeere	arch., neo.	shrub	forest	collected	leaves, buds	**syst.** infusion (mixture): flavour; tincture (buds): tonic, immune system	1	mon
Ricinus communis L. Euphorbiaceae	Rizinus	neo.	dwarf shrub	cult.	bought	oil (seeds)	**syst.** oil: releaf childbirth	1	ant
Rosa canina agg.; *Rosa gallica* L. Rosaceae	Wildrose, Essigrose, Damaszenerrose	ind.	shrub	woods, cult.	collected, bought	flowers, fruits, seeds	**syst.** infusion (flowers) (7): ornamental; infusion, pulp (fruits)(6): cold, Vit. C supply **top.** oil (from seeds) (6): skin care	19	ant
Rosmarinus officinalis L. Lamiaceae	Rosmarin	ind., arch.	shrub	cult.	collected, bought	leaves	**syst.** infusion, tincture (7): blood circulation, digestion **top.** bath (8): blood ciculation, cold feet	15	mon
Rubus idaeus L. Rosaceae	Himbeere	ind.	shrub	forest	collected	leaves	**syst.** infusion: women's health, easing childbirth	5	ant
Rubus fruticosus agg. Rosaceae	Brombeere	ind.	shrub	woods, forest	collected	leaves	**syst.** infusion (mixture): mild adstringent	1	mon
Ruscus aculeatus L. Asparagaceae	Mäusedorn	ind.	shrub	forest	bought	subt. parts	**syst.** phytotherapeutic: venous diseases	1	ant
Ruta graveolens L. Rutaceae	Weinraute	arch.	herb	cult.	collected	leaves	**syst.** infusion, spice (salad): eye support	1	ant
Salix alba agg. Salicaceae	Weide	ind.	tree	riverside	collected, bought	bark	**syst.** infusion: headache	2	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Salvia officinalis L. Lamiaceae	Salbei	ind., arch.	herb	cult.	collected, bought	leaves	**syst.** infusion (7): common cold, sweating **top.** fresh leaves (8): sour throat **vol.** incense(2): cleansing	17	mon
Salvia sclarea L. Lamiaceae	Muskatellersalbei	ind.	herb	cult.	collected	flowers, essential oil	**syst.** infusion (mixture) (1): - **top.** essential oil (3): relaxation (massage), women's health	4	ant
Sambucus nigra L. Adoxaceae	Holunder	ind.	shrub, tree	forest	collected	flowers fruits	**syst.** sirup, infusion (flowers) (10): fever, refreshment **top.** infusion (flowers) (2): fever; ointment (bark) (1): skin care, wounds **syst.** sirup (fruits) (1): immune system	14	ant
Sanicula europaea L. Apiaceae	Sanikel, Scharnikel	ind.	herb	forest	bought	leaves, flowers	**top.** ointment: wound healing	2	mon
Satureja hortensis L. Lamiaceae	Bohnenkraut	arch.	herb	cult.	collected	leaves	**syst.** infusion (mixture): -	1	mon
Saxifraga spp. Saxifragaceae	Traubensteinbrech	ind.	herb	forest	collected	whole plant	**syst.** homeopatic prep.: -	2	mon
Serenoa repens (W.BARTRAM) SMALL Arecaceae	Sägepalme	exot.	tree	cult.	bought	fruits	**syst.** phytopharmaceutical: urological diseases	2	con
Silene flos-cuculi (L.) GREUTER & BURDET Caryophyllaceae	Kuckuckslichtnelke	ind.	herb	wet mead.	collected	flowers	**syst.** infusion: prostata problems	1	-
Silybum marianum (L.) GAERTN. Asteraceae	Mariendistel	arch.	herb	cult.	bought	fruits	**syst.** tincture (11): liver, diuretic, detoxification **top.** ointment (1): easing childbirth	12	ant
Solanum tuberosum L. Solanaceae	Kartoffel	neo	herb	cult.	bought	tubers	**top.** compresse (chest): cough	1	con
Solidago virgaurea agg.	Goldrute	ind.	herb	woods,	collected,	leaves, flowers	**syst.** tincture, infusion: kidney and	12	mon

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Asteraceae				mead.	bought		bladder, diuretic, detoxification		
Sorbus aucuparia agg. Rosaceae	Vogelbeere, Eberesche	ind.	shrub, tree	woods	collected	fruits	**syst.** pulp: Vit. C supply	1	mon
Stachys officinalis (L.) TREVIS.; *S. recta* L. Lamiaceae	Ziest, Bettonica, Aufrechter Ziest	ind.	herb	dry mead.	collected	leaves, flowers	**syst.** infusion (mixture): tonic	2	Mon, ant
Stellaria media agg. Caryophyllaceae	Vögelichrut	ind.	herb	mead., weed	collected	leaves, flowers	**syst.** wild vegetables (fresh): general purification	1	mon
Strophanthus kombe OLIV. Apocynaceae	Strophantus	exot.	vine	trop. forest	bought	seeds	**syst.** homeopatic prep.: -	1	con
Symphytum officinale agg. Boraginaceae	Wallwurz, Beinwell	ind., neo.	herb	wet mead.	collected, bought	subt. parts	**top.** tincture, oil extract, ointment (20): skin care, bone fracture; leaves as fodder (vet) (1): tonic	21	ant
Szygium aromaticum (L.) MERR. & L.M.PERRY Myrtaceae	Gewürznelke, Nägeli	exot.	tree	trop. forest	bought	buds	**syst.** spice (1): desinfection, digeston **top.** essential oil (1): local anesthetic, teeth	2	mon
Tanacetum parthenium agg. Asteraceae	Mueterchrut, Mutterkraut	arch., neo.	herb	cult.	bought	flowers	**syst.** infusion: migraine	1	ant
Taraxacum officinale WEBER Asteraceae	Löwenzahn, Chrottepösche	ind.	herb	fert. mead.	collected, bought	subt. parts, leaves, flowers	**syst.** tincuture, infusion, wild vegetable (fresh); digestion, liver, detoxification, purification	19	ren
Taxus baccata L. Taxaceae	Eibe, Schnuderbeeri	ind.	tree	forest	collected	fruits (arillus)	**syst.** fruits: -	1	ant
Teucrium chamaedrys L. Lamiaceae	Gamander	ind.	dwarf shrub	dry mead.	collected	leaves, flowers	**syst.** infusion: -	1	mon
Thymus serpyllum agg. Lamiaceae	Quendel, Feldthymian	ind.	herb	dry mead.	collected	leaves, flowers	**syst.** infusion, tincture: cough, universal remedy	2	ant
Thymus vulgaris L. Lamiaceae	Thymian	ind., arch.	herb	cult.	collected, bought	leaves, flowers	**syst.** infusion, tincture (19): cough, digestion	28	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
							top. ointment, compress (9): cough, skin care		
Tilia cordata MILL.; *T. platyphyllos* SCOP. Malvaceae	Linde	ind., neo.	tree	forest	collected, bought	flowers	**syst.** infusion (10): common cold, fever, **top.** bath (2): fever, common cold; face lotion (1): skin care	12	mon
Trifolium pratense agg. Fabaceae	Wiesenklee	ind., neo.	herb	fert. mead.	collected, bought	flowers	**syst.** tincture, phytopharmaceutical: menopause	3	ant
Trigonella foenum-graecum L. Fabaceae	Bockshornklee	arch.	herb	cult.	bought	seeds	**syst.** infusion: digestion	2	ant
Triticum aestivum L. Poaceae	Weizen	arch.	herb	cult.	bought	leaves	**syst.** fresh juice: tonic	1	ant
Tropaeolum majus L. Tropaeolaceae	Kapuzinerli, Kapuzinerkresse	neo.	herb	cult.	collected, bought	leaves, flowers, fruits	**syst.** tincture: immune system, detoxification	3	con
Tussilago farfara L. Asteraceae	Huflattich	ind.	herb	ruderal	collected, bought	flowers	**syst.** infusion (mixture) (6): cough **top.** bath (1): hot feet; facial lotion (1): skin care	8	ant
Urtica dioica L. Urticaceae	Brennnessel	ind.	herb	weed, ruderal	collected	leaves	**syst.** infusion (16): detoxification, (kidney, bladder); wild vegetables (5): detoxification **top.** fresh leaves (1): pollinosis	22	mon
Vaccinium myrtillus L. Ericaceae	Heidelbeere	ind.	herb	woods	collected	fruits	**syst.** infusion: diarrhoea	1	mon
Vaccinium vitis-idaea L. Ericaceae	Preiselbeere	ind.	herb	woods	bought	fruits	**syst.** fruit extract: kidney, bladder support	2	con
Valeriana officinalis agg. Caprifoliaceae	Baldrian	ind.	herb	forest, wetlands	bought	subt. parts	**syst.** infusion, tincture: nerves, calming, sedation	12	ant
Veratrum album L. Melanthiaceae	Germer	ind.	herb	mead., pastures	bought	-	**syst.** homeopatic prep.	1	ant
Verbascum thapsus agg.	Königskerze	ind.	herb	ruderal,	collected,	flowers	**syst.** infusion: cough	2	ant

Species	Vernacular Name	Status[1)]	Habit	Habitat	Collected, bought[2)]	Plant part used	Preparation and indication (UR)	Total use reports	Time period[3)]
Scrophulariaceae				wayside	bought				
Verbena officinalis L. Verbenaceae	Eisenkraut	arch.	herb	ruderal, weed	collected	leaves, flowers	**syst.** infusion (mixture): women's health, birth, confinement	1	ant
Veronica officinalis L. Plantaginaceae	Ehrenpreis	ind.	herb	forest	collected	leaves, flowers	**syst.** infusion: skin diseases **top.** skin lotion: skin care	2	ren
Vinca minor L. Apocynaceae	Immergrün	ind.	herb	forest	bought	-	**syst.** homeopathic prep.: -	1	ant
Vincetoxicum hirundinaria MEDIK. Apocynaceae	Schwalbenwurz	ind.	herb	forest	bought	-	**syst.** homeopathic prep.: -	1	ren
Viola odorata L. Violaceae	Veilchen	ind.	herb	woods	collected	flowers	**syst.** infusion (2): cough **top.** oil, tincture (2): skin care	4	ant
Viola tricolor agg. Violaceae	Ackerveilchen	ind., neo.	herb	fields	collected	leaves, flowers	**syst.** infusion: skin care	3	ren
Viscum album agg. Santalaceae	Mistel	ind.	epiphyt	forest, woods	bought	fruits, leaves	**syst.** phytopharmaceutical (1): cancer; tincture (2): cardiovascular	3	mon
Vitex agnus-castus L. Lamiaceae	Mönchspfeffer	exot.	shrub	riverside, wet places	bought	fruits	**syst.** tincture, phytopharmaceutical: women's health	3	con
Vitis vinifera L. Vitaceae	Weinblätter, Reblaub	ind., neo.	vine	cult.	collected	leaves	**syst.** infusion: -	1	ant
Zea mays L. Poaceae	Mais	neo.	herb	cult.	collected	stigmata	**syst.** infusion: -	1	ren
Zingiber officinale ROSCOE Zingiberaceae	Ingwer	exot.	herb	cult.	bought	subt. parts	**syst.** infusion, spiece (7): cold, digestion **top.** poudre, essential oil (2): cataplasm (muscle pain), blood circulation	9	ant

[1)] Status: ind. = indigenous, arch. = archeophyte, neo. = neophyte, exot.=not naturally growing in Switzerland

[2)] collected or cultivated in homegarden; remedie or herb drug bought in store

[3)] the time period the medicinal plant was documented for the first time in the considered herbals: ant = antiquity, mon= monastic, ren= renaissance, con= modern and contemporary

SWISS PLANTS DOCUEMNTED IN HISTORICAL AND CONTEMPORARY HERBALS

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Abies alba Mill.	Pinaceae	p	1	I	0	1	1	1	1
Acer campestre L.	Sapindaceae	p	1	I	0	1	1	1	0
Achillea erba-rotta All. agg.	Asteraceae	h	-	I	0	0	0	1	1
Achillea millefolium L. agg.	Asteraceae	c-h	-	I	1	1	1	1	1
Achillea nana L.	Asteraceae	h	2	I	0	0	0	0	1
Acinos alpinus (L.) Moench.	Lamiaceae	c	2	I	0	1	0	0	0
Acinos arvensis (Lam.) Dandy	Lamiaceae	c-t	6	I	0	0	1	0	1
Aconitum napellus L. agg.	Ranunculaceae	h	-	I	1	1	0	1	0
Acorus calamus L.	Araceae	g	4	N	1	1	1	1	1
Actaea spicata L.	Ranunculaceae	h	1	I	0	0	0	1	0
Adiantum capillus-veneris L.	Adianthaceae	h	3	I/N	1	1	1	1	1
Adonis aestivalis L. agg.	Ranunculaceae	t	-	I/A	1	0	0	0	0
Adonis vernalis L. agg.	Ranunculaceae	h	-	I	0	0	1	1	1
Aegilops ovata L. agg.	Poaceae	t	-	I/N	1	0	0	0	0
Aegopodium podagraria L.	Apiaceae	g-h	1	I	0	0	1	1	1
Aesculus hippocastanum L.	Sapindaceae	p	1	N	0	0	0	1	1
Aethusa cynapium L. agg.	Apiaceae	k-t	-	I/A/N	0	0	1	1	0
Agave americana L.	Asparagaceae	c-k	7	N	0	0	0	1	0
Agrimonia eupatoria L.	Rosaceae	h	6	I	1	1	1	1	1
Agrimonia procera Wallr.	Rosaceae	h	1	I/A	0	0	0	1	0
Agrostemma githago L.	Caryophyllaceae	t	7	A	1	1	1	0	0
Ailanthus altissima (Mill.) Swingle	Simaroubaceae	p	3	Ns	0	0	0	1	0
Ajuga chamaepitys (L.) Schreb.	Lamiaceae	k-t	7	I/A	0	1	1	1	0
Ajuga reptans L.	Lamiaceae	h	8	I	0	0	1	1	0
Alcea rosea L. agg.	Malvaceae	k	-	I/N	0	0	1	1	0
Alchemilla alpina L. agg.	Rosaceae	c	-	I	0	0	0	1	1
Alchemilla vulgaris L. agg.	Rosaceae	h	-	I	0	0	1	1	1
Alisma plantago-aquatica L. agg.	Alismataceae	g	-	I	1	0	1	1	1
Alliaria petiolata (M. Bieb.) Cavara & Grande	Brassicaceae	h-t	1	I	0	0	1	1	1
Allium ascalonicum L.	Amaryllidaceae	g	-	A	0	1	0	0	0
Allium cepa L.	Amaryllidaceae	g	7	Ja	1	1	1	1	1
Allium fistulosum L.	Amaryllidaceae	g	7	A	0	1	0	0	0
Allium oleraceum L. agg.	Amaryllidaceae	g	-	I/A	0	0	1	0	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Allium porrum L. agg.	Amaryllidaceae	g	-	I/N	1	1	1	0	1
Allium sativum L.	Amaryllidaceae	g	7	Ja	1	1	1	1	1
Allium schoenoprasum L.	Amaryllidaceae	g	5	I/A	0	1	1	1	1
Allium sphaerocephalon L.	Amaryllidaceae	g	6	I/A	1	0	0	0	0
Allium ursinum L.	Amaryllidaceae	g	1	I	0	1	1	1	1
Allium vineale L.	Amaryllidaceae	g	7	A/N	0	0	1	0	0
Alnus glutinosa (L.) Gaertn.	Betulaceae	p	1	I	0	1	0	1	0
Alnus viridis (Chaix) DC. agg.	Betulaceae	n	-	I	0	0	1	0	0
Althaea hirsuta L.	Malvaceae	t	7	A/N	0	0	0	1	0
Althaea officinalis L.	Malvaceae	h	7	N	1	1	1	1	1
Amaranthus blitum L. agg.	Amaranthaceae	t	-	I/N	1	1	0	0	1
Ammi majus L.	Apiaceae	t	7	I/A	1	1	1	1	0
Anacamptis pyramidalis (L.) Rich.	Orchidaceae	g	6	I/N	0	0	1	0	0
Anagallis arvensis L.agg.	Primulaceae	t	-	A	1	1	1	1	1
Anchusa arvensis (L.) M. Bieb.	Boraginaceae	t	7	A	0	0	1	0	0
Anchusa italica Retz.	Boraginaceae	h	7	I/A	1	1	1	0	0
Anchusa officinalis L.	Boraginaceae	h-k	7	I/A	0	1	1	0	1
Anemone blanda Schott & Kotschy	Ranunculaceae	g	-	N	0	1	0	0	0
Anemone nemorosa L.	Ranunculaceae	g	1	I	0	0	1	1	0
Anemone ranunculoides L.	Ranunculaceae	g	1	I	0	0	1	0	0
Anethum graveolens L.	Apiaceae	t	7	A	1	1	1	1	1
Angelica sylvestris L.agg.	Apiaceae	k	-	I	0	0	1	1	0
Antennaria dioica (L.) Gaertn.	Asteraceae	c	2	I	0	0	1	1	1
Anthemis arvensis L. agg.	Asteraceae	t	-	I/A	0	0	1	0	0
Anthemis cotula L.	Asteraceae	t	7	A	0	1	1	0	0
Anthemis tinctoria L.agg.	Asteraceae	c-t	-	I/A	1	1	1	0	0
Anthericum liliago L.	Asparagaceae	h	6	I	0	0	1	0	0
Anthoxanthum odoratum L. agg.	Poaceae	h	-	I/N	1	0	0	0	0
Anthriscus cerefolium (L.) Hoffm.	Apiaceae	t	7	A	0	1	1	1	1
Anthriscus sylvestris (L.) Hoffm. agg.	Apiaceae	h	-	I	0	0	1	0	0
Anthyllis vulneraria L. agg.	Fabaceae	h	-	I	0	0	0	1	1
Antirrhinum majus L.	Plantaginaceae	c	-	I/N	0	0	0	1	
Apium graveolens L.	Apiaceae	k-t	7	Ja	0	1	1	1	0
Aquilegia vulgaris agg.	Ranunculaceae	h	-	I/N	0	1	1	1	1
Arctium lappa L. agg.	Asteraceae	k	-	I/A	1	1	1	1	1

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Arctium tomentosum Mill.	Asteraceae	k	7	I/A	0	0	0	1	0
Arctostaphylos uva-ursi (L.) Spreng.	Ericaceae	z	1	I	0	0	0	1	1
Arenaria serpyllifolia L. agg.	Caryophyllaceae	t	-	I/N	0	0	1	0	0
Aristolochia clematitis L.	Aristolochiaceae	g	7	I/A	0	1	1	1	1
Aristolochia rotunda L.	Aristolochiaceae	g	6	I/A	0	1	0	0	0
Armoracia rusticana P. Gaertn. & al.	Brassicaceae	g	7	A	0	1	1	1	1
Arnica montana L.	Asteraceae	h	2	I	0	1	1	1	1
Artemisia abrotanum L.	Asteraceae	z	7	Ja	1	1	1	1	1
Artemisia absinthium L.	Asteraceae	c	7	I?/A	1	1	1	1	1
Artemisia campestris L. agg.	Asteraceae	c	-	I	1	1	0	0	0
Artemisia dracunculus L.	Asteraceae	g-h	7	A	0	1	0	1	1
Artemisia genipi Weber agg.	Asteraceae	c	-	I	0	1	0	0	1
Artemisia pontica L.	Asteraceae	h-z	7	I/N	0	0	1	0	0
Artemisia umbelliformis Lam.	Asteraceae	c	2	I	0	0	0	0	1
Artemisia vulgaris L.agg.	Asteraceae	g-h	-	I/A/N	0	1	1	1	1
Arum italicum Mill.	Araceae	g	7	I/N	1	1	0	0	0
Arum maculatum L. agg.	Araceae	g	-	I	1	1	1	1	1
Aruncus dioicus (Walter) Fernald	Rosaceae	h	1	I	0	0	1	0	0
Arundo donax L.	Poaceae	g	5	N	1	0	0	1	0
Asarum europaeum L. agg.	Aristolochiaceae	g	1	I	1	1	1	1	1
Asparagus officinalis L.	Asparagaceae	g	7	A	1	1	1	1	0
Asparagus tenuifolius Lam.	Asparagaceae	g	1	I	0	0	0	1	0
Asperugo procumbens L.	Boraginaceae	t	7	A	1	0	0	0	0
Asperula arvensis L.	Rubiaceae	t	7	A	0	0	1	0	0
Asphodelus albus Mill. agg.	Xanthorrhoeaceae	h	-	I	0	1	0	0	0
Asplenium adiantum-nigrum L. agg.	Aspleniaceae	h	-	I	0	1	0	0	0
Asplenium ruta-muraria L. agg.	Aspleniaceae	h	-	I	0	0	1	1	1
Asplenium trichomanes L. agg.	Aspleniaceae	h	-	I	1	1	1	0	1
Aster amellus L.	Asteraceae	h	6	I	1	1	1	0	0
Aster linosyris (L.) Bernh.	Asteraceae	h	6	I	0	1	0	0	0
Astragalus exscapus L.	Fabaceae	h	1	I	0	0	0	1	0
Astrantia major L. agg.	Apiaceae	h	-	I	0	0	1	1	1
Athamanta cretensis L.agg.	Apiaceae	h	-	I	1	1	0	0	0
Athyrium filix-femina (L.) Roth agg.	Woodsiaceae	h	-	I	0	0	0	0	1
Atriplex patula L. agg.	Amaranthaceae	t	-	A/N/J	0	1	1	0	1

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Atropa bella-donna L.	Solanaceae	h	1	I	1	1	1	1	0
Aubrieta deltoidea (L.) DC	Brassicaceae	c	3	N	1	0	0	0	0
Avena fatua L.agg.	Poaceae	t	-	A	1	0	0	0	0
Avena sativa L. agg.	Poaceae	t	-	Ja	1	1	1	1	1
Ballota nigra L. agg.	Lamiaceae	g	-	I/A	1	1	1	1	0
Barbarea verna (Mill.) Asch. agg.	Brassicaceae	k-t	-	I/N	0	0	1	1	0
Bellis perennis L. agg.	Asteraceae	h	-	I	0	0	1	1	1
Berberis vulgaris L.	Berberidaceae	n	1	I	0	1	1	1	1
Berula erecta (Huds.) Coville	Apiaceae	g	4	I	0	0	1	0	0
Beta vulgaris L.	Amaranthaceae	k	7	Ja	1	1	1	1	1
Betula alba L. agg.	Betulaceae	p	-	I	0	1	1	1	1
Borago officinalis L.	Boraginaceae	t	7	N	0	1	1	1	1
Botrychium lunaria (L.) Sw.	Ophioglossaceae	g	2	I	0	0	1	0	0
Brassica juncea (L.) Czern.	Brassicaceae	t	7	N	0	0	0	1	0
Brassica napus L.	Brassicaceae	t	7	Jn	0	1	1	0	0
Brassica nigra (L.) W. D. J. Koch	Brassicaceae	t	7	A	1	1	0	0	1
Brassica oleracea L. agg.	Brassicaceae	h-t	-	I/A	1	1	1	0	1
Brassica rapa L. agg.	Brassicaceae	t	-	Ja	1	1	1	0	1
Briza media L.	Poaceae	h	6	I	0	0	0	0	1
Bromus ramosus Huds. agg.	Poaceae	h	-	I	0	0	0	1	0
Bryonia alba L.	Cucurbitaceae	h.li	7	I/A	1	1	0	0	0
Bryonia dioica Jacq.	Cucurbitaceae	h.li	1	I/A	0	1	1	1	0
Buglossoides arvensis (L.) I. M. Johnst. agg.	Boraginaceae	t	-	I/A	0	0	1	0	0
Bunias erucago L.	Brassicaceae	t	7	A	1	0	0	0	0
Bunium bulbocastanum L.	Apiaceae	g	6	I	0	0	1	0	0
Buphthalmum salicifolium L. agg.	Asteraceae	h	-	I	0	0	0	0	1
Bupleurum falcatum L.agg.	Apiaceae	h	-	I	0	0	0	1	0
Bupleurum rotundifolium L. agg.	Apiaceae	t	-	I/A	0	0	1	0	0
Butomus umbellatus L.	Butomaceae	g	4	I	1	0	0	0	0
Buxus sempervirens L.	Buxaceae	n-p	1	I	0	1	1	1	0
Calamintha nepeta (L.) Savi agg.	Lamiaceae	g	-	I/A	0	1	0	1	0
Calendula officinalis L.	Asteraceae	t	7	Ja	0	1	1	1	1
Calla palustris L.	Araceae	a-g	4	I/N	0	0	1	0	0
Calluna vulgaris (L.) Hull	Ericaceae	n-z	1	I	0	0	1	1	1
Caltha palustris L.	Ranunculaceae	h	5	I	0	0	1	1	1
Calystegia sepium (L.) R. Br. agg.	Convolvulaceae	g.li	-	I/N	0	0	1	0	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Campanula rapunculus L.	Campanulaceae	k	6	I	0	0	1	1	0
Campanula trachelium L.	Campanulaceae	h	1	I	0	0	1	0	0
Cannabis sativa L.	Cannabaceae	t	7	A	1	1	1	1	1
Capsella bursa-pastoris (L.) Medikus agg.	Brassicaceae	t	-	I/A	1	1	1	1	1
Capsicum annuum L.	Solanaceae	t	7	N	0	0	1	1	0
Cardamine pratensis L. agg.	Brassicaceae	h	-	I	0	0	1	1	0
Carlina acaulis L. agg.	Asteraceae	h	-	I	0	1	1	1	1
Carlina vulgaris L. agg.	Asteraceae	k	-	I	0	0	1	1	0
Carpinus betulus L.	Betulaceae	p	1	I	0	1	0	1	0
Carthamus lanatus L.	Asteraceae	t	7	I/A	0	1	0	0	0
Carum carvi L.	Apiaceae	k-t	8	I	1	1	1	1	1
Castanea sativa Mill.	Fagaceae	p	1	A	1	1	1	1	0
Celtis australis L.	Ulmaceae	p	3	I	1	1	0	1	0
Centaurea cyanus L.	Asteraceae	t	7	I/A	0	0	1	1	1
Centaurea montana L. agg.	Asteraceae	h	-	I	0	0	1	0	0
Centaurium erythraea Rafn. agg.	Gentianaceae	t	-	I	1	1	0	1	1
Centrantus ruber (L.) DC agg.	Caprifoliaceae	h	-	I/N	0	0	0	1	
Ceterach officinarum Willd.	Aspleniaceae	h	3	I	0	0	0	1	
Chelidonium majus L.	Papaveraceae	h-k	7	I/A	1	1	1	1	1
Chenopodium album L. agg.	Amaranthaceae	t	-	I/N	0	0	1	0	0
Chenopodium ambrosioides L.	Amaranthaceae	k-t	-	N	0	0	0	1	0
Chenopodium bonus-henricus L.	Amaranthaceae	h	7	I	0	0	1	0	1
Chenopodium botrys L.	Amaranthaceae	t	7	A	1	1	1	0	0
Chenopodium polyspermum L.	Amaranthaceae	t	7	A	0	0	1	0	0
Chenopodium rubrum L. agg.	Amaranthaceae	t	-	A/N	0	0	1	0	0
Chimaphila umbellata (L.) W. P. C. Barton	Ericaceae	c.hp	1	I	0	0	0	1	0
Chondrilla juncea L.	Asteraceae	h	6	I/A	1	1	0	0	0
Chrysosplenium alternifolium L.	Saxifragaceae	h	1	I	0	0	0	1	0
Cicer arietinum L.	Fabaceae	t	7	Ja	1	1	1	0	0
Cichorium endivia L.	Asteraceae	t	7	Ja	1	1	1	0	0
Cichorium intybus L.	Asteraceae	h	7	A	1	1	1	1	1
Cicuta virosa L.	Apiaceae	g	4	I	0	1	0	1	0
Cirsium arvense (L.) Scop.	Asteraceae	g	7	I	0	1	1	1	0
Cirsium oleraceum (L.) Scop.	Asteraceae	h	5	I	0	1	0	0	1
Cistus salviifolius L.	Cistaceae	n-z	6	I	1	1	0	0	0
Clematis recta L.	Ranunculaceae	c	6	I	0	0	0	1	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Clematis vitalba L.	Ranunculaceae	p.li	1	I	1	1	1	1	1
Clinopodium vulgare L. agg.	Lamiaceae	g	-	I	1	0	0	0	0
Cochlearia officinalis L. agg.	Brassicaceae	h-t	-	I/N	0	0	0	1	1
Colchicum autumnale L. agg.	Colchicaceae	g	-	I	1	1	1	1	1
Colutea arborescens L. agg.	Fabaceae	n	1	I	0	0	1	1	0
Conium maculatum L.	Apiaceae	k-t	7	A	1	1	1	1	1
Consolida regalis Gray agg.	Ranunculaceae	t	-	A	0	0	1	0	0
Convallaria majalis L.	Asparagaceae	g	1	I/N	1	1	1	1	1
Convolvulus arvensis L.	Convolvulaceae	g.li	7	A	1	1	1	0	0
Conyza canadensis (L.) Cronquist	Asteraceae	t	-	N	0	0	0	1	
Coriandrum sativum L.	Apiaceae	t	7	A	1	1	1	1	1
Cornus alba L. agg.	Cornaceae	n	-	N	0	1	0	0	0
Cornus mas L.	Cornaceae	n-p	1	I/N	1	1	0	1	1
Cornus sanguinea L. agg.	Cornaceae	n	-	I/N	0	1	0	1	1
Coronopus squamatus (Forssk.) Asch.	Brassicaceae	t	7	I?/A	0	1	0	0	0
Corydalis cava (L.) Schweigg. & Körte	Papaveraceae	g	1	I	0	1	1	1	1
Corylus avellana L.	Betulaceae	n-p	1	I	1	1	1	1	1
Crataegus monogyna Jacq. agg.	Rosaceae	n-p	-	I	0	1	0	1	1
Crepis biennis L.	Asteraceae	k	8	I	0	0	1	0	0
Crocus sativus L.	Iridaceae	g	7	Jn	1	1	1	1	1
Cucumis melo L.	Cucurbitaceae	t	7	Jn	1	1	1	0	0
Cucumis sativus L.	Cucurbitaceae	t.li	7	Jn	1	1	1	1	0
Cucurbita maxima Duchesne	Cucurbitaceae	t	7	Jn	0	0	0	1	1
Cucurbita pepo L.	Cucurbitaceae	t.li	7	Jn	1	1	1	1	1
Cupressus sempervirens L.	Cupressaceae	p	1	A	0	1	0	1	0
Cuscuta epithymum (L.) L. agg.	Convolvulaceae	t.li.vp	-	I/N	1	0	0	1	0
Cyclamen hederifolium Aiton	Primulaceae	g	1	N	0	1	0	0	0
Cyclamen purpurascens Mill.	Primulaceae	g	1	I	0	1	1	1	1
Cydonia oblonga L.	Rosaceae	p	1	Ja	1	1	1	1	1
Cymbalaria muralis P. Gaertn. & al.	Plantaginaceae	c-h	3	I/N	0	0	0	1	
Cynara cardunculus L. agg.	Asteraceae	h	-	Ja	1	1	0	1	0
Cynodon dactylon (L.) Pers.	Poaceae	g-h	7	N	0	1	0	1	0
Cynoglossum officinale L. agg.	Boraginaceae	k	-	I/A	1	1	0	1	0
Cyperus esculentus L.	Cyperaceae	g	5	Nw	0	1	0	0	0
Cyperus longus L.	Cyperaceae	g	5	I/A	0	1	1	0	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Cyperus rotundus L.	Cyperaceae	g	5	I?	1	1	0	0	0
Cypripedium calceolus L.	Orchidaceae	g	1	I	0	0	1	1	0
Cytisus scoparius (L.) Link	Fabaceae	n	2	I	0	1	0	1	0
Dactylorhiza maculata (L.) Soo agg.	Orchidaceae	g	-	I	0	0	1	0	0
Dactylorhiza sambucina (L.) Soo	Orchidaceae	g	6	I	0	0	1	0	0
Daphne alpina L. agg.	Thymelaeaceae	n	-	I	1	0	0	0	0
Daphne laureola L.	Thymelaeaceae	n	1	I	0	1	0	0	0
Daphne mezereum L.	Thymelaeaceae	n	1	I	0	1	1	1	0
Datura stramonium L.	Solanaceae	t	7	N	1	1	0	1	0
Daucus carota L.	Apiaceae	k-t	6	A	1	1	1	1	1
Delphinium elatum L. agg.	Ranunculaceae	h	-	I	0	0	1	0	0
Descurainia sophia (L.) Prantl.	Brassicaceae	t	7	I/A	0	0	1	0	0
Dianthus carthusianorum L. agg.	Caryophyllaceae	h	-	I	0	0	1	0	0
Dianthus caryophyllus L.	Caryophyllaceae	c	6	Ja	0	0	1	0	0
Dianthus superbus L. agg.	Caryophyllaceae	h	2	I	0	0	1	0	0
Dictamnus albus L.	Rutaceae	h	6	I	0	1	0	1	0
Digitalis grandiflora Mill.	Plantaginaceae	g-h	2	I	0	0	1	0	0
Digitalis lanata Ehrh.	Plantaginaceae	h-k	-	N	0	0	0	1	0
Digitalis purpurea L.	Plantaginaceae	k-t	1	I/N	0	0	1	1	1
Digitaria sanguinalis (L.) Scop. agg.	Poaceae	t	-	A	0	1	1	0	0
Diplotaxis tenuifolia (L.) DC.	Brassicaceae	h	7	I/A	0	0	1	1	0
Dipsacus fullonum L.	Caprifoliaceae	K	7	Ja	1	1	1	1	0
Doronicum clusii (All.) Tausch agg.	Asteraceae	g	-	I	0	0	1	0	0
Doronicum pardalianches L.	Asteraceae	g	1	I/N	1	0	0	0	0
Dracunculus vulgaris Schott	Araceae	g	7	A	0	1	1	0	0
Drosera rotundifolia L.	Droseraceae	h.ff	5	I	0	0	0	1	0
Dryas octopetala L.	Rosaceae	z	2	I	0	0	1	1	0
Dryopteris filix-mas (L.) Schott agg.	Dryopteridaceae	h	-	I	0	1	1	1	1
Duchesnea indica (Andrews) Focke	Rosaceae	h	1	N	1	0	0	0	0
Echinacea purpurea (L.) Moench	Asteraceae	g	-	N	0	0	0	1	1
Echinops sphaerocephalus L. agg.	Asteraceae	h-k	-	I/N	0	0	1	0	0
Echium vulgare L.	Boraginaceae	k-t	6	I/A	0	0	1	1	1
Elymus repens (L.) Gould agg.	Poaceae	g	-	I	0	0	0	1	1

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Ephedra distachya L. agg.	Ephedraceae	c	-	I	1	0	0	1	0
Epilobium anagallidifolium Lam.	Onagraceae	h	2	I	0	0	0	1	0
Epilobium angustifolium L.	Onagraceae	g-h	3	I	0	0	0	1	0
Epilobium fleischeri Hochst.	Onagraceae	c	2	I	0	0	0	1	1
Epilobium hirsutum L.	Onagraceae	h	5	I	1	0	1	1	0
Epilobium montanum L. agg.	Onagraceae	h	-	I	0	0	0	1	0
Epilobium palustre L.	Onagraceae	h	5	I	0	0	0	1	0
Epilobium parviflorum Schreb.	Onagraceae	h	5	I	0	0	0	1	1
Epilobium roseum Schreb.	Onagraceae	h	7	I	0	0	0	1	0
Equisetum arvense L. agg.	Equisetaceae	g	-	I	0	1	1	1	1
Equisetum fluviatile L.	Equisetaceae	g	4	I	1	0	0	0	0
Equisetum palustre L.	Equisetaceae	g	5	I	0	0	1	0	0
Equisetum telmateia Ehrh.	Equisetaceae	g	1	I	1	0	0	0	0
Erica carnea L.	Ericaceae	z	2	I	0	0	0	1	0
Erica cinerea L.	Ericaceae	n-z	-	I	0	0	0	1	
Erodium cicutarium (L.) L'Hér agg.	Geraniaceae	t	-	I/N	0	1	1	1	0
Erophila verna (L.) DC. agg.	Brassicaceae	t	-	I/N	0	0	0	1	0
Eruca sativa Mill.	Brassicaceae	t	7	A	1	1	1	1	0
Eryngium alpinum L.	Apiaceae	h	2	I	0	0	0	1	0
Eryngium campestre L.	Apiaceae	h	6	I	1	1	1	1	1
Erysimum cheiranthoides L.	Brassicaceae	k	7	I/N	0	0	0	0	1
Erysimum cheiri (L.) Crantz.	Brassicaceae	c	7	Jn	1	0	1	1	0
Erythronium dens-canis L.	Liliaceae	g	1	I	1	0	0	0	0
Euonymus europaeus L.	Celastraceae	n	1	I	0	1	0	1	0
Euonymus japonicus Thunb.	Celastraceae	n-p	1	N	0	1	0	0	0
Euonymus latifolius (L.) Mill.	Celastraceae	n	1	I	0	1	0	0	0
Eupatorium cannabinum L.	Asteraceae	h	5	I	0	0	1	1	0
Euphorbia chamaesyce L. agg.	Euphorbiaceae	t	-	A/N	1	0	0	0	0
Euphorbia characias L. agg.	Euphorbiaceae	n-z	-	I	1	0	0	0	0
Euphorbia esula L. agg.	Euphorbiaceae	h	-	I/N	1	1	1	1	1
Euphorbia helioscopia L.	Euphorbiaceae	t	7	A	1	1	1	0	0
Euphorbia lathyris L.	Euphorbiaceae	k-t	7	N	1	1	1	0	0
Euphorbia myrsinites L.	Euphorbiaceae	c	-	N	1	1	0	0	0
Euphorbia peplus L.	Euphorbiaceae	t	7	A	1	1	1	1	0
Euphorbia platyphyllos L. agg.	Euphorbiaceae	h-t	-	I/A	1	1	1	0	0
Euphorbia spinosa L.	Euphorbiaceae	c	-	I	1	0	0	0	0
Euphrasia rostkoviana Hayne	Orobanchaceae	t.hp	-	I	0	0	1	1	1

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
agg.									
Fagopyrum esculentum Moench	Polygonaceae	t	7	A	0	0	1	1	0
Fagus sylvatica L.	Fagaceae	p	1	I	0	1	1	1	1
Festuca pratensis Huds. agg.	Poaceae	h	-	I/N	0	0	1	0	0
Ficus carica L.	Moraceae	p	3	I/N	1	1	1	1	1
Filipendula ulmaria (L.) Maxim.	Rosaceae	h	5	I	0	0	1	1	1
Filipendula vulgaris Moench	Rosaceae	h	6	I	0	1	1	0	0
Foeniculum vulgare L. agg.	Apiaceae	k-t	-	I/A	1	1	1	1	1
Fragaria vesca L.	Rosaceae	h	1	I	0	1	0	1	1
Frangula alnus Mill.	Rhamnaceae	n	1	I	0	1	0	1	1
Fraxinus excelsior L. agg.	Oleaceae	p	-	I	0	1	0	1	1
Fraxinus ornus L.	Oleaceae	p	1	I	1	1	0	1	1
Fumaria capreolata L.	Papaveraceae	t.li	7	I/N	1	0	0	0	0
Fumaria officinalis L. agg.	Papaveraceae	t	-	A/N	1	1	1	1	1
Gagea lutea (L.) Ker Gawl. agg.	Liliaceae	g	-	I/A	0	0	1	0	0
Galanthus nivalis L. agg.	Amaryllidaceae	g	-	I/N	0	0	1	0	0
Galega officinalis L.	Fabaceae	h	1	N	0	0	1	1	0
Galeopsis ladanum L. agg.	Lamiaceae	t	-	I/A	0	0	0	1	1
Galeopsis tetrahit L.agg.	Lamiaceae	t	-	I	0	0	0	1	0
Galium aparine L. agg.	Rubiaceae	t.li	-	I/A	1	0	1	1	0
Galium mollugo L. agg.	Rubiaceae	h	-	I	0	0	1	1	0
Galium odoratum (L.) Scop.	Rubiaceae	g	1	I	0	0	0	1	1
Galium verum L. agg.	Rubiaceae	h	-	I	1	0	1	1	1
Genista germanica L.	Fabaceae	z	6	I/N	0	0	1	1	0
Genista tinctoria L.	Fabaceae	z	6	I	0	0	1	1	1
Gentiana acaulis L. agg.	Gentianaceae	h	-	I	0	0	0	1	1
Gentiana asclepiadea L.	Gentianaceae	h	1	I	0	0	0	1	1
Gentiana cruciata L.	Gentianaceae	h	6	I	0	0	1	0	0
Gentiana lutea L. agg.	Gentianaceae	h	-	I	1	1	1	1	1
Gentiana pannonica Scop.	Gentianaceae	h	2	I	0	0	0	1	0
Gentiana punctata L. agg.	Gentianaceae	h	-	I	0	0	0	1	0
Gentiana purpurea L.	Gentianaceae	h	2	I	0	1	0	1	1
Geranium dissectum L.	Geraniaceae	t	7	A	0	0	1	0	0
Geranium pratense L.	Geraniaceae	h	6	I/N	0	0	1	0	0
Geranium robertianum L. agg.	Geraniaceae	t	-	I/N	0	1	1	1	1
Geranium rotundifolium L.	Geraniaceae	t	7	A/N	0	0	1	0	0
Geranium sanguineum L.	Geraniaceae	h	1	I	0	0	1	1	0
Geranium sylvaticum L. agg.	Geraniaceae	h	-	I	0	0	0	0	1

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Geum montanum L.	Rosaceae	h	2	I	0	0	0	0	1
Geum rivale L.	Rosaceae	h	5	I	0	0	1	1	1
Geum urbanum L. agg.	Rosaceae	h	-	I/N	0	0	1	1	1
Gladiolus communis L. agg.	Iridaceae	g	-	I	1	1	1	0	0
Glaucium corniculatum (L.) Rudolph	Papaveraceae	t	3	N	1	0	0	0	0
Glaucium flavum Crantz	Papaveraceae	k-t	3	N	1	1	1	0	0
Glechoma hederacea L.agg.	Lamiaceae	h	-	I	0	1	1	1	1
Globularia vulgaris L. agg.	Plantaginaceae	h	-	I	0	0	0	1	0
Glycine max (L.) Merr.	Fabaceae	t	7	Jn	0	0	0	1	0
Glycyrrhiza glabra L.	Fabaceae	h	7	A	1	1	1	1	1
Gnaphalium sylvaticum L. agg.	Asteraceae	h-k	-	I	0	0	0	1	0
Gnaphalium uliginosum L.	Asteraceae	t	7	I	0	0	1	0	0
Gratiola officinalis L.	Plantaginaceae	g	5	I	0	0	0	1	0
Gymnadenia conopsea (L.) R. Br. agg.	Orchidaceae	g	-	I	0	0	1	0	0
Hedera helix L.	Araliaceae	c-p.li	1	I	1	1	1	1	1
Helianthemum nummularium (L.) Mill. agg.	Cistaceae	z	-	I	0	0	0	1	0
Helianthus annuus L.	Asteraceae	t	7	N	0	0	0	1	0
Helianthus tuberosus L. agg.	Asteraceae	g	-	Nw	0	0	0	1	0
Heliotropium europaeum L.	Boraginaceae	t	7	A	0	1	0	1	0
Helleborus foetidus L.	Ranunculaceae	c	1	I	0	0	1	0	1
Helleborus niger L. agg.	Ranunculaceae	g	-	I	1	1	0	1	0
Helleborus orientalis Lam.	Ranunculaceae	g	1	N	1	0	0	0	0
Helleborus viridis L. agg.	Ranunculaceae	g	-	I	0	1	1	0	0
Hemerocallis fulva (L.) L.	Xanthorrhoeaceae	g	7	N	1	0	0	0	0
Hepatica nobilis Schreb.	Ranunculaceae	h	1	I	0	0	1	1	1
Heracleum sphondylium L. *agg.*	Apiaceae	h-k	-	I	1	1	1	1	1
Herniaria glabra L.	Caryophyllaceae	k-t	3	I/N	0	0	0	1	0
Herniaria hirsuta L.	Caryophyllaceae	c-t	3	I/N	0	0	0	1	0
Hesperis matronalis L. agg.	Brassicaceae	k-t	-	I/N	0	0	1	1	0
Hieracium pilosella L .agg.	Asteraceae	h	-	I	0	1	1	1	1
Hippophaë rhamnoides L.agg.	Elaeagnaceae	n-p	-	I	0	0	0	1	1
Holosteum umbellatum L. agg.	Caryophyllaceae	t	-	I/A	1	0	0	0	0
Hordeum murinum L. agg.	Poaceae	t	-	A/N	0	0	1	0	0
Hordeum vulgare L. agg.	Poaceae	t	-	Ja	1	1	1	1	1
Hottonia palustris L.	Primulaceae	a	4	I	0	0	0	1	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Humulus lupulus L.	Cannabaceae	h.li	1	I/N	0	1	1	1	1
Hydrocotyle vulgaris L.	Apiaceae	h	5	I	0	0	0	1	0
Hyoscyamus niger L.	Solanaceae	k-t	7	I/A	1	1	1	1	1
Hypericum coris L.	Hypericaceae	z	2	I	1	1	0	0	0
Hypericum hirsutum L.	Hypericaceae	h	1	I	0	0	1	0	0
Hypericum montanum L.	Hypericaceae	h	1	I	0	0	1	0	0
Hypericum perforatum L. agg.	Hypericaceae	h	-	I	1	1	1	1	1
Hypochaeris radicata L.	Asteraceae	h	8	I/A	0	0	1	0	0
Hyssopus officinalis L. agg.	Lamiaceae	z	-	I/A	0	1	1	1	1
Iberis amara L. agg.	Brassicaceae	t	-	I	1	0	0	1	0
Ilex aquifolium L.	Aquifoliaceae	n-p	1	I	0	0	0	1	1
Impatiens glandulifera Royle	Balsaminaceae	t	7	Ns	0	0	0	1	0
Impatiens noli-tangere L.	Balsaminaceae	t	1	I	0	0	0	1	
Inula britannica L.	Asteraceae	h	5	I	0	1	0	0	0
Inula helenium L.	Asteraceae	h	7	I/A	1	1	1	1	1
Iris foetidissima L.	Iridaceae	h	6	I?/N	1	0	1	0	0
Iris germanica L. agg.	Iridaceae	h	-	Jn	1	1	1	1	1
Iris pseudacorus L.	Iridaceae	h	5	I	0	1	1	0	0
Isatis tinctoria L. agg.	Brassicaceae	k-t	-	I	1	1	1	1	0
Jasminum officinale L.	Oleaceae	n	7	N	1	0	0	0	0
Juglans regia L.	Juglandaceae	p	1	A	1	1	1	1	1
Juncus articulatus L. agg.	Juncaceae	h	-	I	0	0	1	0	0
Juncus effusus L. agg.	Juncaceae	h	-	I	0	1	0	0	0
Juniperus communis L. agg.	Cupressaceae	z	-	I	1	1	1	1	1
Juniperus sabina L.	Cupressaceae	z	6	I	1	1	1	1	1
Kickxia spuria (L.) Dumort.	Plantaginaceae	t	7	A	0	0	1	0	0
Knautia arvensis (L.) Coult. aggr.	Caprifoliaceae	h	-	I/A	0	0	1	1	0
Laburnum alpinum (Mill.) Bercht. & J. Presl agg.	Fabaceae	n-p	-	I	0	0	1	0	0
Lactuca sativa L.	Asteraceae	t	7	Ja	1	1	1	0	0
Lactuca serriola L.	Asteraceae	k-t	7	I/N	0	1	1	0	0
Lactuca virosa L.	Asteraceae	t	7	I/A	0	1	0	1	0
Lamium album L.	Lamiaceae	h	7	I/A	0	1	1	1	1
Lamium galeobdolon (L.) L. agg.	Lamiaceae	c	-	I/J	0	0	1	1	1
Lamium maculatum (L.) L.	Lamiaceae	h	7	I	0	0	1	0	1
Larix decidua Mill.	Pinaceae	p	2	I/N	1	1	1	1	1
Laserpitium latifolium L.	Apiaceae	h	2	I	0	1	1	0	0
Laserpitium siler L.	Apiaceae	h	2	I	0	1	0	0	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Lathyrus cicera L.	Fabaceae	t	7	A	0	1	0	0	0
Lathyrus sativus L.	Fabaceae	t.li	7	A/N	0	0	1	1	0
Lathyrus sylvestris L. agg.	Fabaceae	g.li	-	I/N	0	0	1	0	0
Lathyrus tuberosus L.	Fabaceae	g.li	7	A	0	0	1	0	0
Laurus nobilis L.	Lauraceae	n-p	1	A	1	1	0	1	1
Lavandula angustifolia Mill.	Lamiaceae	z	3	I/N	0	1	1	1	1
Lemna minor L. agg.	Lemnaceae	s	-	I	1	1	0	1	0
Lens culinaris Medik. agg.	Fabaceae	t	-	I/A	1	1	1	0	0
Leontopodium alpinum Cass.	Asteraceae	h	2	I	0	0	1	1	1
Leonurus cardiaca L. agg.	Lamiaceae	h	-	I/N	0	0	1	1	1
Lepidium campestre (L.) R. Br. agg.	Brassicaceae	h-t	-	I/N	0	0	1	0	0
Lepidium latifolium L.	Brassicaceae	h	7	A	0	1	1	0	0
Lepidium ruderale L.	Brassicaceae	k-t	7	A	0	0	1	0	0
Lepidium sativum L.	Brassicaceae	t	7	Ja	1	1	1	1	1
Leucanthemum vulgare Lam. agg.	Asteraceae	h	-	I	0	0	1	1	0
Leucojum vernum L.	Amaryllidaceae	g	1	I/N	0	0	1	0	0
Levisticum officinale Koch	Apiaceae	k	7	A	1	1	1	1	1
Ligusticum mutellina (L.) Crantz	Apiaceae	h	2	I	0	1	0	1	1
Ligustrum vulgare L.	Oleaceae	n	1	I	0	1	1	1	0
Lilium bulbiferum L. agg.	Liliaceae	g	-	I	0	0	1	0	0
Lilium martagon L.	Liliaceae	g	1	I	0	1	1	0	1
Linaria alpina (L.) Mill. agg.	Plantaginaceae	c	-	I	0	0	0	1	0
Linaria vulgaris Mill. agg.	Plantaginaceae	g-h	-	I/A	0	0	1	1	1
Linum catharticum L. agg.	Linaceae	h-t	-	I	0	0	0	1	0
Linum usitatissimum L. agg.	Linaceae	h-t	-	I/J	1	1	1	1	1
Listera ovata (L.) R. Br.	Orchidaceae	g	5	I	0	0	1	0	0
Lithospermum officinale L.	Boraginaceae	h	1	I	0	1	1	1	0
Lolium perenne L.	Poaceae	h	8	I/N	1	1	0	0	0
Lolium temulentum L.	Poaceae	t	7	A	1	1	0	1	0
Lonicera caprifolium L.	Caprifoliaceae	n.li	1	I/A	0	1	0	1	0
Lonicera etrusca Santi	Caprifoliaceae	n.li	1	I/N	1	1	0	0	0
Lonicera periclymenum L.	Caprifoliaceae	n.li	1	I	1	1	1	0	0
Lotus corniculatus L. agg.	Fabaceae	h	-	I/N	0	0	1	1	1
Lupinus albus L.	Fabaceae	t	7	N	0	0	1	0	0
Lupinus angustifolius L. agg.	Fabaceae	t	-	I/N	1	0	0	0	0
Lycium barbarum L. agg.	Solanaceae	n	-	I?/N	0	0	0	1	

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Lycopodium clavatum L. agg.	Lycopodiaceae	c	-	I	0	0	1	1	1
Lycopus europaeus L. agg.	Lamiaceae	g	-	I	0	1	0	1	0
Lysimachia nummularia L.	Primulaceae	h	1	I	0	1	1	1	1
Lysimachia punctata L.	Primulaceae	h	1	I/N	1	0	0	0	0
Lysimachia vulgaris L.	Primulaceae	h	5	I	1	0	1	1	0
Lythrum salicaria L.	Lythraceae	h	5	I	1	0	0	1	0
Mahonia aquifolium (Pursh) Nutt.	Berberidaceae	n	1	Nw	0	0	0	1	0
Maianthemum bifolium (L.) L.F. Schmidt	Asparagageceae	g	1	I	1	0	0	0	0
Malus sylvestris Miller agg.	Rosaceae	p	-	I/J	1	1	1	1	1
Malva alcea L.	Malvaceae	h	7	I/N	0	0	1	1	0
Malva parviflora L. agg.	Malvaceae	t	-	I/A	0	0	1	1	1
Malva sylvestris L. agg.	Malvaceae	k-t	-	I/N	1	1	1	1	1
Marrubium vulgare L.	Lamiaceae	c-h	7	A	1	1	1	1	1
Matricaria chamomilla L.	Asteraceae	t	7	I/A	1	1	1	1	1
Matricaria discoidea DC.	Asteraceae	k-t	7	N	0	0	0	1	0
Medicago lupulina L.	Fabaceae	h-t	8	A	0	0	1	0	0
Medicago sativa L. aggr.	Fabaceae	h	-	I/A	1	0	0	1	0
Melampyrum arvense L. agg.	Orobanchceae	t.hp	-	I/A	0	0	1	0	0
Melilotus officinalis Lam agg.	Fabaceae	k-t	-	A/N	0	0	1	1	1
Melissa officinalis L.	Lamiaceae	g-h	7	A/N	1	1	1	1	1
Melittis melissophyllum L.	Lamiaceae	g-h	1	I	0	1	1	1	0
Mentha pulegium L.	Lamiaceae	g-h	5	I/N	1	1	1	1	1
Mentha spicata L. agg.	Lamiaceae	g-h	-	I/J	1	1	1	1	1
Menyanthes trifoliata L.	Menyanthaceae	g	4	I	0	0	0	1	1
Mercurialis annua L.	Euphorbiaceae	t	7	A	1	1	1	1	1
Mercurialis perennis L. agg.	Euphorbiaceae	g	-	I	1	1	1	1	1
Mespilus germanica L.	Rosaceae	p	1	A	1	1	0	1	1
Meum athamanticum Jacq.	Apiaceae	h	2	I	1	1	1	1	1
Mimulus guttatus DC.	Phrymaceae	g	5	N	0	0	0	1	0
Monotropa hipopitys L. agg.	Ericaceae	g.sp	-	I	0	0	0	1	0
Morus alba L.	Moraceae	n-p	3	N	1	0	0	0	0
Morus nigra L.	Moraceae	n-p	3	A	1	1	1	1	1
Muscari comosum (L.) Mill. agg.	Asparagaceae	g	-	I	1	1	1	1	0
Myosotis arvensis L.	Boraginaceae	k-t	7	I	0	0	1	1	0
Myosotis scorpioides L. agg.	Boraginaceae	h-t	-	I	0	0	0	1	0
Myricaria germanica (L.) Desv.	Tamaricaceae	z	3	I	0	0	1	0	0
Myriophyllum spicatum L.	Haloragaceae	a	4	I	1	1	0	0	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Myrrhis odorata (L.) Scop.	Apiaceae	h	8	I/N	1	1	0	0	1
Narcissus poëticus L. agg.	Amaryllidaceae	g	-	I/N	1	1	1	0	0
Narcissus pseudonarcissus L.	Amaryllidaceae	g	2	I/N	0	0	0	1	0
Nardus stricta L.	Poaceae	h	2	I	0	1	0	0	0
Nasturtium officinale R. Br. agg.	Brassicaceae	a	-	I	1	1	1	1	1
Nepeta cataria L.	Lamiaceae	h	7	I/A	0	1	1	1	1
Neslia paniculata (L.) Desv. agg.	Brassicaceae	t	-	I/A	1	0	0	0	0
Nicotiana tabacum L.	Solanaceae	t	7	Jn	0	0	0	1	1
Nigella arvensis L.	Ranunculaceae	t	7	A	0	0	1	0	0
Nigella damascena L.	Ranunculaceae	t	7	N	1	0	1	1	0
Nuphar lutea (L.) Sm. agg.	Nymphaeaceae	a	-	I	0	1	1	1	0
Nymphaea alba L. agg.	Nymphaeaceae	a	-	I	1	1	1	1	0
Ocimum basilicum L.	Lamiaceae	t	7	A	1	1	1	1	1
Oenanthe aquatica (L.) Poir. agg.	Apiaceae	k*-t	-	I	0	0	1	1	1
Oenanthe pimpinelloides agg.	Apiaceae	g	-	I	0	0	0	1	0
Oenothera biennis L. agg.	Onagraceae	k-t	-	N	0	0	0	1	1
Olea europaea L.	Oleaceae	p	1	A	1	1	0	1	1
Ononis spinosa L. agg.	Fabaceae	c-h	-	I	0	0	1	1	1
Onopordum acanthium L.	Asteraceae	k-t	7	A	1	1	1	1	1
Ophioglossum vulgatum L.	Ophioglossaceae	g	5	I	0	0	1	0	0
Ophrys holosericea (Burm. F.) Greuter agg.	Orchidaceae	g	-	I	0	0	1	0	0
Orchis mascula (L.) L. agg.	Orchidaceae	g	-	I	0	0	1	0	0
Orchis militaris L.	Orchidaceae	g	6	I/N	0	0	1	0	0
Orchis morio L. agg.	Orchidaceae	g	-	I/N	1	0	1	0	0
Orchis papilionacea L.	Orchidaceae	g	6	I	1	0	0	0	0
Orchis ustulata L. agg.	Orchidaceae	g	-	I	0	0	1	0	0
Origanum majorana L.	Lamiaceae	c-t	7	A	0	1	1	1	1
Origanum vulgare L. agg.	Lamiaceae	c-h	-	I	1	1	1	1	1
Ornithogalum umbellatum L. agg.	Asparagaceae	g	-	I/N	1	0	0	1	
Osmunda regalis L.	Osmundaceae	g-h	1	I/N	0	0	0	1	0
Oxalis acetosella L.	Oxalidaceae	c-g	1	I	0	1	1	1	0
Paeonia officinalis L. agg.	Paeoniaceae	h	-	I	1	1	1	1	0
Panicum miliaceum L. agg.	Poaceae	t	-	A/N	1	1	1	0	0
Papaver hybridum L. agg.	Papaveraceae	t	-	I/A	1	0	0	0	0
Papaver rhoeas L. agg.	Papaveraceae	t	-	A/N	1	1	1	1	0
Papaver somniferum L.	Papaveraceae	t	7	Ja	1	1	1	1	1

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Parietaria officinalis L. agg.	Urticaceae	h	-	I/N	1	1	1	1	0
Paris quadrifolia L.	Melanthiaceae	g	1	I	0	0	1	1	0
Pastinaca sativa L. agg.	Apiaceae	k-t	-	I/A/N	1	1	1	1	0
Petasites albus (L.) Gaertn.	Asteraceae	g	1	I	0	0	0	1	1
Petasites hybridus (L.) Gaerter et al.	Asteraceae	g	5	I	1	1	1	1	1
Petroselinum crispum (Mil.) Fuss	Apiaceae	k	7	A	1	1	1	1	1
Peucedanum cervaria (L.) Lapeyr.	Apiaceae	h	1	I	1	1	1	0	0
Peucedanum officinale L.	Apiaceae	h	-	I/N	1	1	1	0	0
Peucedanum ostruthium (L.) W. D. J. Koch	Apiaceae	h	2	I/N	0	1	1	1	1
Phaseolus vulgaris L.	Fabaceae	t.li	7	Jn	1	1	1	1	0
Phillyrea latifolia L. agg.	Oleaceae	n	-	I	1	0	0	0	0
Phragmites australis	Poaceae	g	4	I	0	0	1	1	
Phyllitis scolopendrium (L.) Newman	Aspleniaceae	h	1	I	0	0	1	1	1
Physalis alkekengi L. aggr.	Solanaceae	g	-	I/A/N	1	1	1	1	0
Phytolacca americana L.	Phytolaccaceae	h	7	Nw	0	0	0	1	0
Picea abies (L.) H. Karst.	Pinaceae	p	1	I/N	0	1	1	1	1
Pimpinella major (L.) Huds. agg.	Apiaceae	h	8	I	0	1	1	1	1
Pimpinella saxifraga L. agg.	Apiaceae	h	-	I/A	1	1	1	1	1
Pinguicula vulgaris L.	Lentibulariaceae	h.ff	5	I	0	0	0	1	
Pinus mugo Turra agg.	Pinaceae	n-p	-	I	0	0	0	1	0
Pinus nigra J. F. Arnold	Pinaceae	p	1	I/N	1	1	0	0	0
Pinus sylvestris L. agg.	Pinaceae	p	1	I/N	0	1	1	1	1
Pisum sativum L. agg.	Fabaceae	t.li	-	Ja	1	1	1	1	0
Plantago alpina L. agg.	Plantaginaceae	h	-	I/N	0	0	0	1	1
Plantago arenaria Waldst. & Kit.	Plantaginaceae	t	6	I/N	0	0	0	1	0
Plantago coronopus L.	Plantaginaceae	h-t	-	I/N	0	1	1	0	0
Plantago lanceolata L. agg.	Plantaginaceae	h	-	I	0	1	1	1	1
Plantago major L. agg.	Plantaginaceae	h	-	I	0	1	1	1	1
Plantago media L.	Plantaginaceae	h	6	I	0	1	1	1	1
Plantago sempervirens Crantz	Plantaginaceae	c	-	I/N	0	1	0	0	0
Platanthera bifolia (L.) Rich.	Orchidaceae	g	5	I	0	1	1	0	0
Platanus orientalis L.	Platanaceae	p	1	N	1	0	1	1	0
Polemonium caeruleum L.	Polemoniaceae	h	2	I/N	1	0	0	0	0
Polygala amara L. agg.	Polygalaceae	h	-	I	0	0	0	1	1
Polygala vulgaris L.	Polygalaceae	h	-	I	0	0	0	1	

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Polygonatum multiflorum (L.) All.	Asparagaceae	g	1	I	0	1	1	0	0
Polygonatum odoratum (Mill.) Druce	Asparagaceae	g	6	I	0	1	0	1	1
Polygonatum verticillatum (L.) All.	Asparagaceae	g	1	I	0	1	1	0	0
Polygonum amphibium L.	Polygonaceae	a-g	5	I	0	0	0	1	0
Polygonum aviculare L. agg.	Polygonaceae	t	-	I/N	1	1	1	1	1
Polygonum bistorta L.	Polygonaceae	h	2	I	0	1	1	1	1
Polygonum hydropiper L. agg.	Polygonaceae	t	-	I	1	0	1	1	0
Polygonum lapathifolium L. agg.	Polygonaceae	t	-	I/N	0	0	1	0	0
Polygonum persicaria L.	Polygonaceae	t	7	I	1	0	0	0	0
Polygonum viviparum L.	Polygonaceae	h	2	I	0	0	0	0	1
Polypodium vulgare L. agg.	Polypodiaceae	h	-	I	1	1	1	1	1
Populus alba L.	Salicaceae	p	1	I	1	1	1	1	0
Populus nigra L. agg.	Salicaceae	p	-	I/A	1	0	0	1	0
Populus tremula L.	Salicaceae	p	1	I	0	1	0	1	1
Portulaca oleracea L. agg.	Portulacaceae	t	-	A	1	1	1	1	0
Potamogeton natans L. agg.	Potamogetonaceae	a	-	I	1	0	1	0	0
Potentilla alba L.	Rosaceae	h	6	I	0	0	1	0	0
Potentilla anserina L.	Rosaceae	h	7	I	0	1	1	1	1
Potentilla erecta (L.) Raeusch. agg.	Rosaceae	h	-	I	0	1	1	1	1
Potentilla recta L. agg.	Rosaceae	h	-	I/N	0	0	0	1	0
Potentilla reptans L.	Rosaceae	h	7	I	1	1	1	1	1
Potentilla neumanniana Rchb. agg.	Rosaceae	c	-	I	0	0	1	0	0
Primula elatior (L.) L. agg.	Primulaceae	h	-	I	0	0	1	1	1
Primula halleri J. F. Gmel.	Primulaceae	h	2	I	0	0	1	0	0
Primula veris L. agg.	Primulaceae	h	-	I	0	1	1	1	1
Prunella vulgaris L .agg.	Lamiaceae	h	-	I	0	0	1	1	1
Prunus armeniaca L.	Rosaceae	p	3	A	1	0	1	1	1
Prunus avium L.	Rosaceae	p	1	I/J	1	1	1	1	1
Prunus cerasifera Ehrh.	Rosaceae	p	1	A	0	0	0	1	0
Prunus cerasus L. aggr.	Rosaceae	n-p	-	Ja	1	1	1	1	0
Prunus domestica L. agg.	Rosaceae	p	-	Ja	1	1	1	1	1
Prunus dulcis (Mill.) D. A. Webb	Rosaceae	n-p	1	A	0	1	0	0	1
Prunus laurocerasus L.	Rosaceae	n-p	1	Ns	0	0	0	1	1
Prunus padus L. agg.	Rosaceae	n-p	-	I	0	0	0	1	0
Prunus persica (L.) Batsch	Rosaceae	p	3	A	1	1	1	0	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Prunus spinosa L.	Rosaceae	n	1	I	1	1	1	1	1
Pteridium aquilinum (L.) Kuhn agg.	Polypodiaceae	g	-	I	0	1	1	1	0
Pulicaria dysenterica (L.) Bernh.	Asteraceae	g	5	I/A	0	0	1	0	0
Pulmonaria angustifolia L. agg.	Boraginaceae	h	-	I	0	0	0	1	0
Pulmonaria officinalis L. agg.	Boraginaceae	h	-	I/A/N	0	1	1	1	1
Pulsatilla pratensis L. agg.	Ranunculaceae	h	-	I	0	0	0	1	0
Pulsatilla vulgaris Mill. agg.	Ranunculaceae	h	-	I	0	0	1	1	0
Punica granatum L.	Lythraceae	n	3	A	1	1	1	1	0
Pyrola rotundifolia L.	Ericaceae	h.hp	2	I	0	0	1	1	0
Pyrus communis L. agg.	Rosaceae	n-p	-	I/A/N	1	1	1	1	1
Quercus ilex L.	Fagaceae	n-p	1	I/N	1	0	0	0	0
Quercus robur L. agg.	Fagaceae	p	-	I	1	1	1	1	1
Ranunculus acris L. agg.	Ranunculaceae	h	-	I/N	0	0	1	1	0
Ranunculus aquatilis L. agg.	Ranunculaceae	a-k	-	I	1	1	0	0	0
Ranunculus arvensis L.	Ranunculaceae	t	7	A	0	0	1	0	0
Ranunculus auricomus L. agg.	Ranunculaceae	h	1	I/J	0	0	1	0	0
Ranunculus bulbosus L. agg.	Ranunculaceae	h	-	I	0	0	1	1	1
Ranunculus ficaria L. agg.	Ranunculaceae	g	-	I	1	1	1	1	0
Ranunculus glacialis L.	Ranunculaceae	h	2	I	0	0	0	1	0
Ranunculus lanuginosus L.	Ranunculaceae	h	1	I	1	0	0	0	0
Ranunculus muricatus L.	Ranunculaceae	t	-	A	1	0	0	0	0
Ranunculus repens L.	Ranunculaceae	h	7	I	0	0	1	0	0
Ranunculus sardous Crantz.	Ranunculaceae	k-t	7	I/A	0	1	0	0	0
Ranunculus sceleratus L.	Ranunculaceae	t	7	I	0	1	1	1	0
Ranunculus thora L.	Ranunculaceae	h	2	I	0	0	0	1	0
Raphanus sativus L.	Brassicaceae	t	7	A	1	1	1	1	1
Reseda lutea L.	Resedaceae	k	7	I/N	0	0	1	0	0
Reseda luteola L.	Resedaceae	k	7	A	0	0	1	1	0
Reseda phyteuma L.	Resedaceae	k-t	7	I/N	1	0	0	0	0
Rhamnus cathartica L.	Rhamnaceae	n	1	I	0	1	0	1	1
Rhamnus saxatilis Jacq.	Rhamnaceae	n	2	I	1	0	0	0	0
Rheum rhabarbarum L.	Polygonaceae	g	7	N	0	0	1	1	1
Rhodiola rosea L.	Crassulaceae	h	2	I	0	0	1	0	0
Rhododendron ferrugineum L. agg.	Ericaceae	z	-	I	0	0	1	1	1
Ribes nigrum L.	Grossulariaceae	n	1	A/N	0	1	0	1	1
Ribes rubrum L. agg.	Grossulariaceae	n	-	I/A	0	0	1	1	1

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Ribes uva-crispa L.	Grossulariaceae	n	1	A	0	0	1	0	1
Robinia pseudoacacia L.	Fabaceae	p	1	Ns	0	0	0	1	1
Rorippa sylvestris (L.) Besser agg.	Brassicaceae	h	-	I/N	0	0	1	0	0
Rosa canina L. aggr.	Rosaceae	n	-	I/J	1	1	1	1	1
Rosa gallica L.	Rosaceae	n	6	I/N	1	1	1	1	0
Rosa pendulina L.	Rosaceae	n	2	I	0	0	0	1	0
Rosmarinus officinalis L.	Lamiaceae	n	3	I/A	0	1	1	1	1
Rubia tinctorum L.	Rubiaceae	h.li	7	A	1	1	1	1	1
Rubus fruticosus agg.	Rosaceae	d-f	-	I/J	0	1	1	1	1
Rubus idaeus L.	Rosaceae	d	1	I	1	1	1	1	1
Rumex acetosa L. *aggr.*	Polygonaceae	h	-	I	1	1	1	1	1
Rumex alpinus L.	Polygonaceae	h	2	I	0	0	0	1	0
Rumex aquaticus L.	Polygonaceae	h	5	I	1	0	0	0	0
Rumex crispus L. agg.	Polygonaceae	h		I/N	0	0	0	1	0
Rumex hydrolapathum Huds.	Polygonaceae	h	5	I	0	1	0	0	0
Rumex obtusifolius L. agg.	Polygonaceae	h	-	I	0	0	1	0	1
Rumex patientia L. agg.	Polygonaceae	h	-	I/N	0	1	1	1	0
Ruscus aculeatus L.	Asparagaceae	g-z	1	I	1	1	0	1	0
Ruta graveolens L.	Rutaceae	z	6	A	1	1	1	1	1
Salix alba L. agg.	Salicaceae	p	-	I	1	1	1	1	1
Salix caprea L.	Salicaceae	n-p	1	I	0	1	0	0	1
Salix daphnoides Vill.	Salicaceae	n-p	3	I	0	0	0	1	0
Salix fragilis L.	Salicaceae	p	1	I/N	0	0	0	1	0
Salix purpurea L. agg.	Salicaceae	n	-	I	0	0	1	1	0
Salix repens L. agg.	Salicaceae	z	-	I	0	0	1	0	0
Salix viminalis L.	Salicaceae	n-p	1	I/A	0	0	0	1	0
Salvia officinalis L. agg.	Lamiaceae	z	3	I/A	0	1	1	1	1
Salvia pratensis L. agg.	Lamiaceae	h	-	I	0	0	1	0	1
Salvia sclarea L.	Lamiaceae	k	7	I	0	1	1	1	0
Sambucus ebulus L.	Adoxaceae	g	7	I	1	1	1	1	1
Sambucus nigra L.	Adoxaceae	n-p	1	I	1	1	1	1	1
Sambucus racemosa L.	Adoxaceae	n	1	I	0	0	0	0	1
Sanguisorba minor Scop. agg.	Rosaceae	h	-	I/N	0	1	1	1	0
Sanguisorba officinalisL. agg.	Rosaceae	h	-	I	0	0	1	1	0
Sanicula europaea L.	Apiaceae	h	1	I	0	1	1	1	1
Saponaria officinalis L.	Caryophyllaceae	h	7	I/N	1	1	1	1	1
Sarracenia purpurea L.	Sarraceniaceae	h.ff	5	N	0	0	0	0	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Satureja hortensis L.	Lamiaceae	t	7	A	0	1	1	1	1
Saxifraga granulata L.	Saxifragaceae	h	6	I	0	1	1	1	0
Scabiosa columbaria L. agg.	Caprifoliaceae	h	-	I	0	0	0	1	1
Scandix pecten-veneris L. agg.	Apiaceae	t	-	I/A	1	1	0	0	0
Scilla bifolia L. agg.	Asparagaceae	g	-	I	0	0	1	0	0
Scleranthus annuus L. agg.	Caryophyllaceae	t	-	I	0	0	0	1	0
Scrophularia auriculata L. agg.	Scrophulariaceae	h	-	I	0	0	1	0	1
Scrophularia nodosa L.	Scrophulariaceae	h	1	I	0	1	1	1	1
Secale cereale L.	Poaceae	t	7	Ja	1	1	1	1	1
Sedum acre L.	Crassulaceae	c	3	I/N	0	1	1	1	1
Sedum album L.	Crassulaceae	c	3	I/A	0	0	1	1	0
Sedum cepaea L.	Crassulaceae	t	3	I	1	0	0	0	0
Sedum rupestre L. agg.	Crassulaceae	c	-	I/N	0	0	1	0	0
Sedum telephium L. agg.	Crassulaceae	h	-	I/N	0	0	1	1	1
Sempervivum montanum L. agg.	Crassulaceae	c	-	I	0	0	0	0	1
Sempervivum tectorum L. agg.	Crassulaceae	c	-	I/J	0	1	1	1	1
Senecio jacobaea L. agg.	Asteraceae	k	-	I	0	0	1	1	0
Senecio nemorensis L. agg.	Asteraceae	h	-	I	0	0	1	0	1
Senecio vulgaris L.	Asteraceae	t	7	A	1	1	1	1	0
Seseli annuum L. aggr.	Apiaceae	k-t	-	I	1	0	0	0	0
Seseli libanotis (L.) W.D.J. Koch	Apiaceae	h-k	6	I	1	0	0	0	0
Setaria viridis (L.) P. Beauv. agg.	Poaceae	t	-	A/N	0	1	0	0	0
Silene coronaria (L.) Clariv.	Caryophyllaceae	h-t	6	I/N	1	0	0	0	0
Silene gallica L.	Caryophyllaceae	t	7	A	1	1	0	0	0
Silene vulgaris (Moench) Garcke	Caryophyllaceae	h	6	I	0	0	0	0	1
Silybum marianum (L.) Gaertn.	Asteraceae	t	7	A	1	1	1	1	0
Sinapis alba L. agg.	Brassicaceae	t	-	Ja	1	1	1	1	1
Sinapis arvensis L.	Brassicaceae	t	7	A	0	1	1	1	0
Sison amomum L.	Apiaceae	t	7	I/A	1	1	1	0	0
Sisymbrium irio L.	Brassicaceae	t	7	A/N	0	1	0	0	0
Sisymbrium officinale (L.) Scop.	Brassicaceae	t	7	A	0	1	1	0	0
Sium latifolium L.	Apiaceae	a	5	I	1	0	0	0	0
Solanum dulcamara L.	Solanaceae	c.li	1	I	1	0	0	1	1
Solanum melongena L.	Solanaceae	t	7	N	0	0	1	1	0
Solanum nigrum L. agg.	Solanaceae	t	-	I/A/N	1	1	1	1	1
Solanum tuberosum L.	Solanaceae	g	7	Jn	0	0	0	1	1
Solidago canadensis L. agg.	Asteraceae	h	-	Ns	0	0	0	1	0
Solidago virgaurea L. agg.	Asteraceae	h	-	I	0	1	0	1	1

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Sonchus arvensis L. agg.	Asteraceae	g-h	-	I/A	1	0	1	0	0
Sonchus oleraceus L. agg.	Asteraceae	t	-	I/A	1	0	1	0	0
Sorbus aria (L.) Crantz agg.	Rosaceae	p	-	I/J	0	0	0	0	1
Sorbus aucuparia L. agg.	Rosaceae	n-p	-	I	0	1	1	1	1
Sorbus domestica L.	Rosaceae	p	1	I/A	1	1	1	1	0
Sorghum bicolor (L.) Moench	Poaceae	t	-	Jn	0	1	1	0	0
Sorghum halepense (L.) Pers.	Poaceae	g	7	Jn	1	0	0	0	0
Spinacia oleracea L.	Amaranthaceae	t	7	Ja	0	0	1	1	1
Stachys germanica L. agg.	Lamiaceae	c-h	-	I/N	1	0	1	0	0
Stachys officinalis (L.) Trevis. agg.	Lamiaceae	h	6	I	0	1	1	1	1
Stachys palustris L.	Lamiaceae	g	-	I/N	0	0	0	1	
Stachys recta L. agg.	Lamiaceae	h-z	-	I	1	0	1	1	0
Stachys sylvatica L.	Lamiaceae	h	1	I	0	0	0	1	0
Staphylea pinnata L.	Staphyleaceae	n	1	I	1	0	0	0	1
Stellaria holostea L.	Caryophyllaceae	c	1	I	0	0	1	0	0
Stellaria media aggr.	Caryophyllaceae	t	-	I	0	1	1	1	1
Stipa pennata L. agg.	Poaceae	h	-	I	0	0	1	0	0
Succisa pratensis Moench	Caprifoliaceae	h	5	I	0	0	1	1	0
Symphytum officinale L. agg.	Boraginaceae	h	-	I/N	1	1	1	1	1
Syringa vulgaris L.	Oleaceae	n	3	N	0	0	1	0	0
Tamus communis L.	Dioscoreaceae	g.li	1	I	1	1	0	1	0
Tanacetum balsamita L.	Asteraceae	h	3	N	0	0	0	1	
Tanacetum cinerariifolium (Trevir.) Sch. Bip.	Asteraceae	h	3	N	0	0	0	1	
Tanacetum parthenium (L.) Sch. Bip. agg.	Asteraceae	h	-	A/N	1	1	1	0	0
Tanacetum vulgare L.	Asteraceae	h	7	I/N	0	1	1	1	1
Taraxacum officinale F. H. Wigg. agg.	Asteraceae	h	-	I	0	0	1	1	1
Taxus baccata L.	Taxaceae	p	1	I	1	1	0	1	0
Teucrium botrys L.	Lamiaceae	t	7	I/A	0	0	1	0	0
Teucrium chamaedrys L.	Lamiaceae	z	6	I	0	1	1	1	1
Teucrium scordium L. agg.	Lamiaceae	h	-	I	1	1	1	1	0
Teucrium scorodonia L. agg.	Lamiaceae	h	-	I	0	1	1	1	0
Thalictrum flavum L. agg.	Ranunculaceae	h	-	I	1	0	1	0	0
Thuja occidentalis L.	Cupressaceae	p	1	N	0	0	0	1	1
Thymus serpyllum L. agg.	Lamiaceae	c	-	I	1	1	1	1	1
Thymus vulgaris L.	Lamiaceae	z	-	I/A	1	1	1	1	1

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Tilia cordata Mill. Agg.	Malvaceae	p	-	I/N	0	1	1	1	1
Tragopogon crocifolius L.	Asteraceae	k	7	I	1	0	0	0	0
Tragopogon porrifolius L. agg.	Asteraceae	k	-	I/J	1	1	0	0	0
Tragopogon pratensis L. agg.	Asteraceae	k	-	I/N	0	0	1	1	0
Trapa natans L.	Trapaceae	s	4	I	1	0	0	0	0
Tribulus terrestris L.	Zygophyllaceae	t	7	A	1	0	0	0	0
Trifolium arvense L. agg.	Fabaceae	t	-	I/N	0	1	1	1	0
Trifolium fragiferum L.	Fabaceae	h	6	I/N	0	1	0	0	0
Trifolium montanum L. agg.	Fabaceae	h	-	I	0	0	1	0	1
Trifolium pratense L. agg.	Fabaceae	h-t	-	I/N	1	1	1	0	1
Trigonella caerulea (L.) Ser.	Fabaceae	t	7	Ja	0	0	1	0	0
Triticum aestivum L. agg.	Poaceae	t	-	Ja	1	1	1	1	1
Tussilago farfara L.	Asteraceae	g	3	I	1	1	1	1	1
Typha latifolia L. agg.	Typhaceae	g	-	I/N	0	0	1	0	0
Ulex europaeus L.	Fabaceae	n	1	I/N	0	0	0	1	0
Ulmus glabra Huds. agg.	Ulmaceae	p	-	I/N	0	1	0	1	1
Urtica dioica L. agg.	Urticaceae	h	7	I	0	1	1	1	1
Urtica urens L.	Urticaceae	t	7	I/A	1	1	1	1	0
Vaccinium myrtillus L.	Ericaceae	z	1	I	0	1	1	1	1
Vaccinium vitis-idaea L. agg.	Ericaceae	z	1	I	0	0	0	1	1
Valeriana celtica L. agg.	Caprifoliaceae	h	-	I	1	1	0	0	0
Valeriana montana L. agg.	Caprifoliaceae	h	-	I	0	0	0	0	1
Valeriana officinalis L. agg.	Caprifoliaceae	h	-	I	1	1	1	1	1
Valerianella locusta (L.) Laterr. agg.	Caprifoliaceae	t	-	I/A/N	0	0	1	0	0
Veratrum album L. agg.	Melanthiaceae	h	-	I	1	1	1	1	1
Verbascum blattaria L.	Scrophulariaceae	k	7	I/N	0	0	1	0	0
Verbascum lychnitis L.	Scrophulariaceae	k	6	I	0	1	1	0	1
Verbascum nigrum L. agg.	Scrophulariaceae	h-k	-	I/N	0	1	1	0	0
Verbascum thapsus L. agg.	Scrophulariaceae	k-t	-	I	1	1	1	1	1
Verbena officinalis L.	Verbenaceae	k-t	7	A	1	1	1	1	1
Veronica agrestis L. agg.	Plantaginaceae	h-t	-	I/N	0	0	1	0	0
Veronica austriaca L. agg.	Plantaginaceae	c-h	-	I/A	0	0	1	0	0
Veronica beccabunga L.	Plantaginaceae	h	4	I	0	1	1	1	1
Veronica chamaedrys L. agg.	Plantaginaceae	c-h	-	I	0	0	1	0	1
Veronica hederifolia L. agg.	Plantaginaceae	t	-	I/A/N	0	0	1	0	0
Veronica officinalis L.	Plantaginaceae	c	1	I	0	0	1	1	1
Viburnum opulus L.	Caprifoliaceae	n	1	I	0	0	0	1	0

Species	Plantfamily	LF[1)]	EG[2)]	AE[3)]	ANT[4)]	MON[5)]	REN[6)]	CON[7)]	ETHN[8)]
Vicia cracca L. agg.	Fabaceae	h.li	-	I	1	0	0	0	0
Vicia ervilia (L.) Willd.	Fabaceae	t	7	N	1	1	0	0	0
Vicia faba L.	Fabaceae	t	7	Ja	1	1	1	1	0
Vicia sativa L. agg.	Fabaceae	t	-	I/A	0	1	1	0	0
Vicia sepium L. agg.	Fabaceae	h.li	8	I	0	0	1	0	0
Vinca minor L.	Apocynaceae	z	1	I	1	1	1	1	1
Vincetoxicum hirundinaria Medik.	Apocynaceae	g.li	1	I	0	0	1	1	1
Viola alba Besser agg.	Violaceae	h	-	I	0	1	0	0	0
Viola calcarata L. agg.	Violaceae	h	-	I	0	0	0	0	1
Viola canina L. agg.	Violaceae	h	-	I	0	0	0	0	1
Viola hirta L. agg.	Violaceae	h	-	I	1	1	1	1	1
Viola tricolor L. agg.	Violaceae	h-t	-	I/N	0	0	1	1	1
Viscum album L. agg.	Santalaceae	e.hp	-	I	0	1	1	1	1
Vitis labrusca L.	Vitaceae	p.li	7	N	1	0	0	0	1
Vitis vinifera L. agg.	Vitaceae	p.li	-	I/N/J	1	1	1	1	1
Xanthium strumarium agg.	Asteraceae	t	-	I/N	1		1	1	0
Zea mays L.	Poaceae	t	7	Jn	0	0	1	1	1
TOTAL species					**284**	**366**	**476**	**477**	**303**

[1)] growth form: geophytes (a, c, d, e, f, g, h, k), herbs (t), trees (p), shrubs (z, n), vine (li); (cf. Tab. 13)

[2)] ecological groups: forest (1), mountain (2), pioneer plant (3), water (4), marsh (5), low fertile, dry meadow (6), weed, ruderal (7), fertile meadows (8), cultivated (9); (cf. Tab. 14)

[3)] indigenous (I), archeophytes (A, Ja, I/A), neophytes (N,Jn, I/N); (cf. Tab. 12); for further details on the different categories see Landolt (2010)

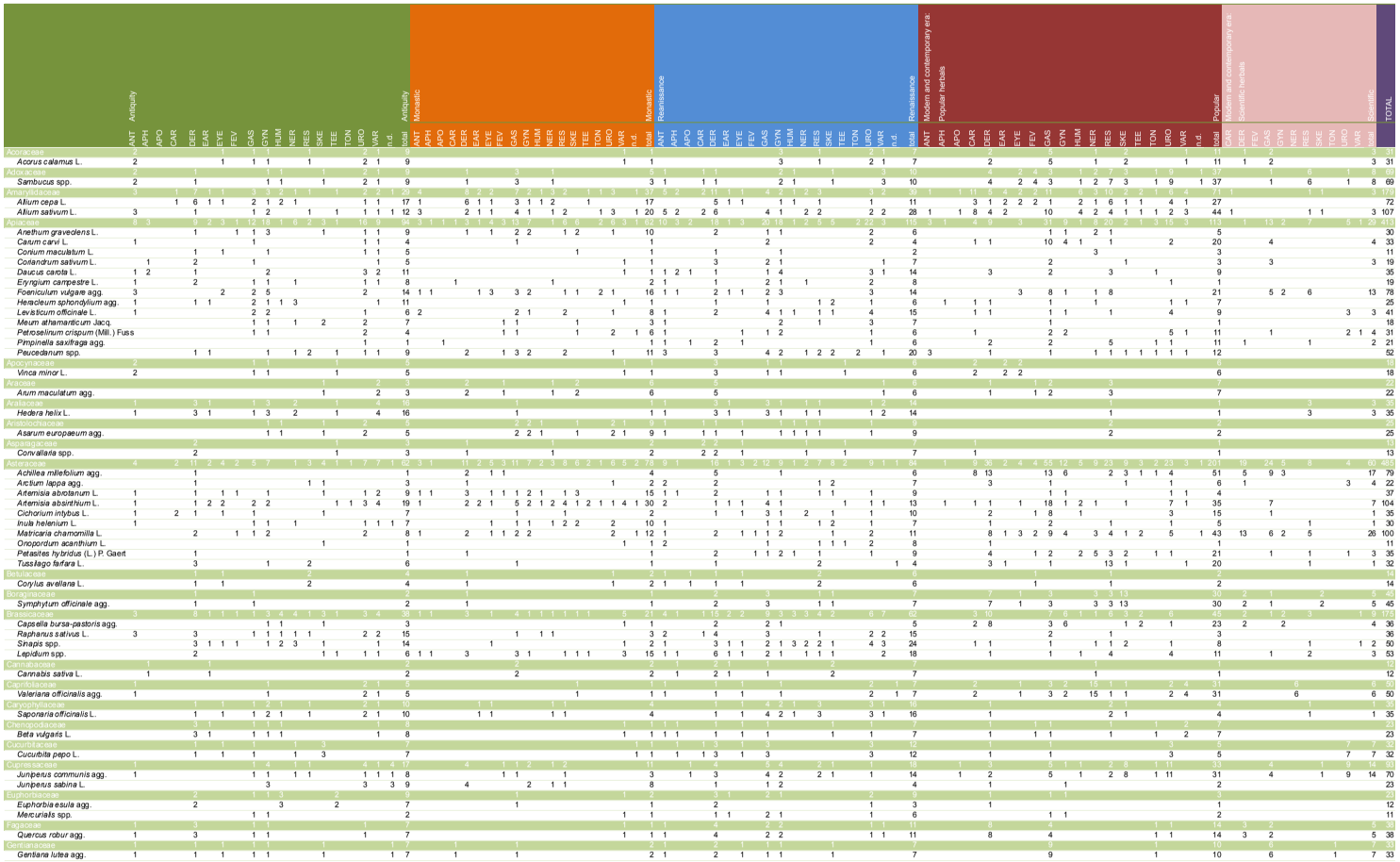
[4)] Antiquity

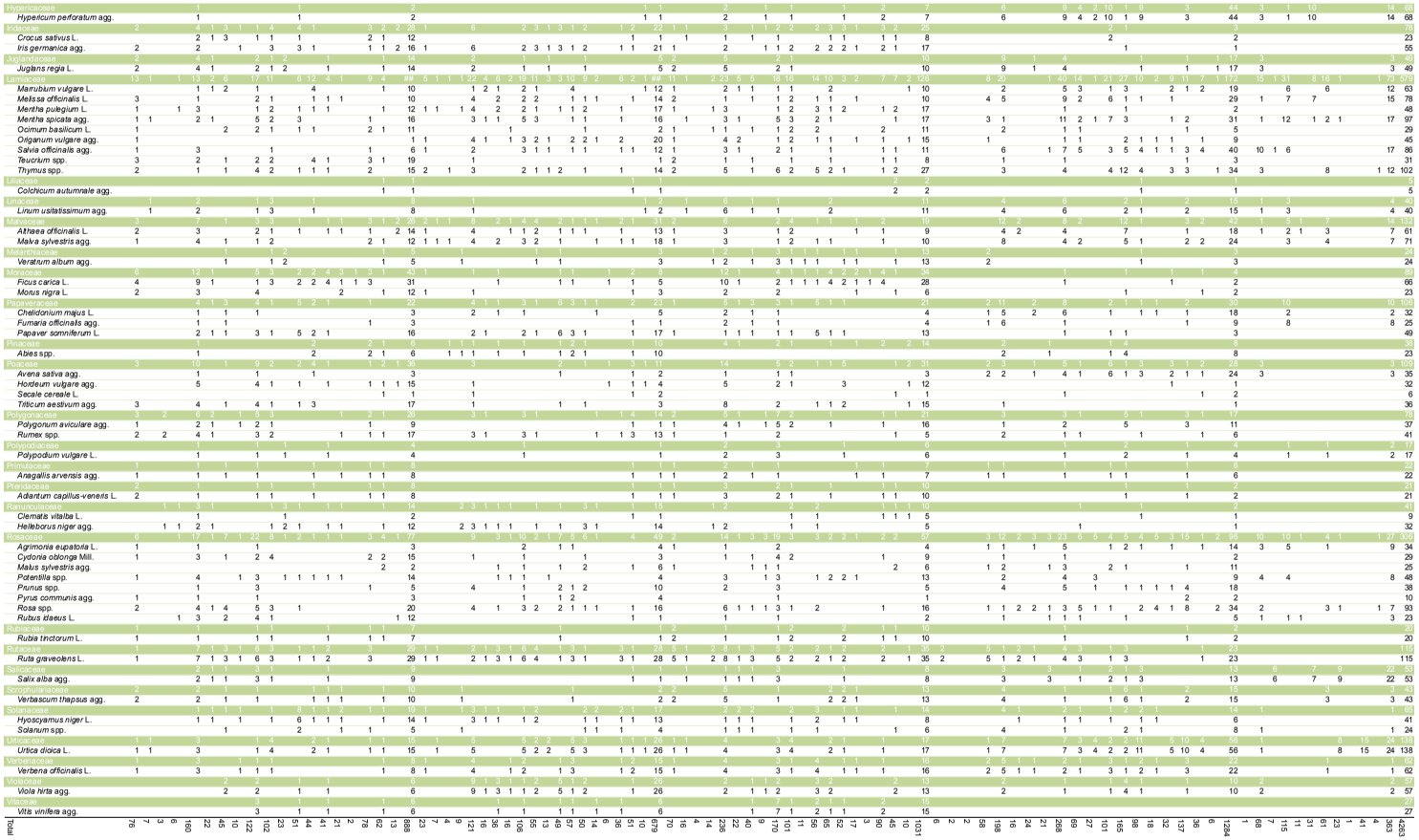
[5)] Monastic medicine

[6)] Renaissance

[7)] Modern and contemporary era

[8)] Ethnobotanical studies





Species Time period	Herbal [1]	Appli-cation [2]	Plant part	Use Category [3]
***Achillea millefolium* agg.**				
Antiquity				
Blutflüsse, alte und frische Wunden und Fisteln	DIOS	-	herba	DER
Monastic period				
Im Körperinnern eine Wunde	HvB	syst	-	DER
Wunden	HvB	top	-	DER
vom Vergiessen der Tränen in den Augen verdunkelt	HvB	top	-	EYE
Dreitagefieber	HvB	syst	-	FEV
Renaissance				
böse Fistel	LF	-	herba	DER
treiben auch das gerunnen Blut und seind in summa treffenliche Wundkreüter	LF	-	herba	DER
allerley eüsserlichen und innerlichen wunden und geschwaeren	LF	syst	herba	DER
allerley eüsserlichen und innerlichen wunden und geschwaeren	LF	top	herba	DER
stellen Blut, zerstossen und übergelegt	LF	top	herba	DER
nützen den Frawen so sie zuviel fliessen ihrer Krankheyt	LF	top	herba	GYN
Popular herbals				
Hämorrhoiden	AV	syst	herba	CAR
Kreislaufunterstützung (Thrombose / Embolien)	AV	syst	herba	CAR
regt Funktion des Blutgefässsystems an, gegen Schwindel, Blutandrang im Kopf, Wechseljahrbeschwerden	BVA	syst	leaves	CAR
Zirkulationsstörungen, Hämorrhoiden, Krampfadern, Angina pectoris, Herzenge	BVA	syst	flowers	CAR
Hämorrhoiden	JK	syst	herba	CAR
Zirkulationsfördernde Wirkung	KN	syst	herba	CAR
venösen Gefässerkrankungen	UB	syst	herba	CAR
Skrofulose, Neigung zu Ekzemen	AV	syst	herba	DER
akute Venenentzündung, Thrombosen, Venenpflege	AV	top	herba	DER
Nasenbluten, Förderung der Blutgerinnung	BVA	syst	flowers	DER
Afterriss, Verletzungen, wunde Brustwarzen	BVA	top	flowers	DER
Afterriss, Verletzungen, wunde Brustwarzen	BVA	top	leaves	DER
Hämorrhoiden	JK	top	herba	DER
Wunden von Stich, Schlag, Schnitt oder Schürfungen	JK	top	herba	DER
Wundbehandlung	UB	top	herba	DER
Volksheilkunde: Hämostyptikum (z.B. Hämorrhoidenblutungen)	WI	top	herba	DER
Schuppenflechte, schlecht heilende Geschwüre, Wunden	KN	top	herba	EAR
Appetitlosigkeit, Durchfall (Säuglinge)	AV	syst	herba	GAS
Magenbeschwerden	BVA	syst	flowers	GAS
Appetitlosigkeit, gegen starkes Abweichen, Blut im Stuhlgang	JK	syst	herba	GAS
Magenkrämpfen	JK	syst	herba	GAS
Appetitlosigkeit, Magen- und Darmkrämpfen, Dickdarmentzündung, Leberschwellung	KN	syst	herba	GAS
Gasbildung, Verstopfung, Leberstauung	KN	syst	herba	GAS
Kopfleiden, die von wässrigen Stoffen oder Verschleimung im Kopfe herrühren, leicht Verschleimung von Brust und Lunge	KN	syst	herba	GAS

Species Time period	Herbal [1)]	Appli-cation [2)]	Plant part	Use Category [3)]
Magenerkrankungen / Amara aromatica	UB	syst	herba	GAS
schmerzhafte Periode, starken / schwachen Menstruationsblutungen, Weissfluss, Menstruationsanomalien, Regelung der Periode, Gebärmutterkatarrh, Gebärmutterblutung, Wechseljahren	BVA	syst	flowers	GYN
stärken Mutterschaftsorgane, Weissfluss, zu starken Blutfluss, regulieren die Periode, bei Frauenleiden eine Kur mit Schafgarbentee angezeigt.	JK	syst	herba	GYN
Kräftigung der weiblichen Unterleibsorgane	KN	syst	herba	GYN
Unregelmässigkeit der Periode	KN	syst	herba	GYN
Volksheilkunde: Menstruationsbeschwerden	WI	syst	herba	GYN
Lungenleiden	JK	syst	herba	RES
Lungenerkrankungen	KN	syst	herba	RES
Rheumatismus	JK	syst	herba	SKE
verstocktes Blut in den inneren Organen, das oft eine Folge von Brüchen, Stoss ist	JK	syst	herba	SKE
Brüchen	JK	top	herba	SKE
Zahnweh	JK	top	herba	TEE
Iva-Likör	JK	syst	herba	TON
Blasenentzündung	AV	syst	herba	URO
Wassersucht	AV	syst	herba	URO
Nieren-, Blasen-, Gallensteine	JK	syst	herba	URO
Bettnässer	KN	syst	herba	URO
Scientific monographs				
small superficial wounds	EMA	top	herba	DER
supportive treatment of small wounds, mild inflammations of the skin and mucous membranes, as an insect repellent	ESCOP	top	herba	DER
entzündliche Haut- und Schleimhauterkrankungen	WI	top	herba	DER
temporary loss of appetite / mild spasmodic gastrointestinal complaints including bloating and flatulence	EMA	syst	flowers	GAS
loss of appetite, dyspeptic disorders such as mild spasmodic complaints in the abdominal region	ESCOP	syst	herba	GAS
Appetitlosigkeit, dyspeptische Beschwerden usw.	WI	syst	herba	GAS
minor spasms associated with menstrual periods	EMA	syst	herba	GYN
spasm of the small pelvis	ESCOP	top	herba	GYN
Pelvipathia vegetativa (schmerzhafte Krampfzustände im kleinen Becken)	WI	top	herba	GYN
***Allium sativum* L.**				
Antiquity				
befördert den Harn; treibt, genossen, den Harn und wirkt eröffnend. Er ist auch den Wassersüchtigen heilsam	DIOS	syst	bulb	URO
Gegessen treibt er den Bandwurm aus	DIOS	syst	bulb	GAS
getrunken tötet er Läuse und Wanzen	DIOS	syst	bulb	VAR
Luftröhre (die Stimme) hell und bringt Linderung bei anhaltendem Husten	DIOS	syst	bulb	RES
von der Viper und von der Hämorrhois gebissen sind, wenn anhaltend Wein genommen, oder wenn er (der Knoblauch) mit Wein zerrieben und getrunken wird.	DIOS	syst	bulb	ANT
Abkochung der Dolde dient als Sitzbad zur Beförderung der Menstruation und der	DIOS	top	bulb	GYN

Species Time period	Herbal [1)]	Appli-cation [2)]	Plant part	Use Category [3)]
Nachgeburt.				
beruhigt Zahnschmerzen, wenn sie im Munde behalten wird.	DIOS	top	bulb	TEE
Ebenso wird er auch gegen den Biss des tollen Hundes mit Erfolg aufgelegt.	DIOS	top	bulb	ANT
Mit Feigenblättern und römischem Kümmel ist er ein Umschlag gegen die Spitzmaus	DIOS	top	bulb	n.d.
nützlich gegen die nachtheilige Wirkung der Veränderung des Wassers	DIOS	top	bulb	ANT
Sugillationen unter den Augen und die Fuchskrankheit; die an Alopekie leiden; heilt er Hautausschlag; Mit Honig vertreibt er weiße Flecken, Flechten, Leberflecken, bösen Grind, Schorf und Aussatz	DIOS	top	bulb	DER
[Abkochung der Dolde dient als Sitzbad zur Beförderung der Menstruation und der Nachgeburt.] Zu demselben Zwecke wird er in der Räucherung angewandt	DIOS	vol	bulb	GYN
Monastic period				
Augen werden rein	HVB	syst	-	EYE
Blasenschmerz und Blasengeschwulst vermindert	MF	syst	-	URO
erschöpften Leib gesund machen	MF	syst	-	TON
gesottn tut's dem Husten gut und stillt das Keuchen, roh wie gekocht macht es die rauhe Stimme klar	MF	syst	-	RES
grosse Geschwülste	MF	syst	-	DER
heilt Allium Stiche und Bisse, die Schlange und Skorpion dem Menschen beibringen, mit Honig aufgelegt auch Hundebisse	MF	syst	bulb	ANT
hilft es gegen den Stuhlzwang	MF	syst	-	GAS
hilft es gegen verschiedene Lungenbeschwerden	MF	syst	-	RES
Hippokrates: mit dem Rauch die weiblich Scham erwärmt, die Nachgeburt herausgetrieben werden kann	MF	syst	-	GYN
Nierenkranke	MF	syst	-	URO
[Praxagoras] erweicht den Leib	MF	syst	-	n.d.
[Praxagoras] Gelbsucht	MF	syst	-	GAS
[...] Schläfen damit bestreicht, lindert es Kopfschmerz	MF	top	-	NER
unheilbringende Bisse heilen	MF	syst	-	DER
vertreibt es Darmwürmer, sowie Bandwürmer	MF	syst	-	GAS
Wassersüchtigen, trocknet die wasserflüssigen Körpersäfte	MF	syst	-	URO
weder Trunk unbekannten Wassers, noch häufiger Wechsel verschiedener Aufenthaltsorte	MF	syst	-	ANT
heilt Allium Stiche und Bisse, die Schlange und Skorpion dem Menschen beibringen, mit Honig aufgelegt auch Hundebisse	MF	top	-	ANT
ins Ohr, wenn es schmerzt			-	EAR
durch den Duft werden schädliche Spulwürmer vertrieben	MF	vol	-	GAS
Renaissance				
denen so mancherley Wasser trinken müssen	LF	syst	-	ANT
gut denen so von natern oder schlangen gebissen sind	LF	syst	-	ANT
lindert den Stulgang	LF	syst	-	GAS
macht dünn gebluet und ein rot angesicht	LF	syst	-	CAR
macht helle stimm und lindert den alten Husten	LF	syst	-	RES
macht lust zu den eelichen wercken	LF	syst	-	APH
macht neygung zum Schlaf	LF	syst	-	NER
tödt leüss und nissen	LF	syst	-	VAR

Species Time period	Herbal [1)]	Appli-cation [2)]	Plant part	Use Category [3)]
treibt aus die breiten Würmer	LF	syst	-	GAS
treibt den Harn	LF	syst	-	URO
gut denen so von einem wütenden Hund gebissen	LF	top	-	ANT
vertreibt allerley grind, rauden, masen und flecken	LF	top	-	DER
Popular herbals				
hoher Blutdruck und Arteriosklerose, Vorbeugung Arteriosklerose	AV	syst	bulb	CAR
Krebs	AV	syst	bulb	VAR
Lymphdrüsentätigkeit	AV	syst	bulb	VAR
Verstopfung	AV	syst	bulb	GAS
Verstopfung, Wurmtreibend	AV	syst	bulb	GAS
Kopfweh	AV	top	bulb	NER
Ohrenweh	AV	top	bulb	EAR
Zahnweh	AV	top	bulb	TEE
Flechten, Eissen und Ausschlägen, Skrofulöse und Bleichsüchtige	JK	syst	bulb	DER
Gicht und Rheumatimus, insbesondere die schmerzhafte Darmgicht	JK	syst	bulb	SKE
hohem Blutdruck	JK	syst	bulb	CAR
macht Ansteckungskeime unschädlich	JK	syst	bulb	VAR
Nierenstein	JK	syst	bulb	URO
Reinigung von Magen, Gedärmen und Blut	JK	syst	bulb	GAS
vertreibt die Würmer	JK	syst	bulb	GAS
Ohrenwehtropfen	JK	top	bulb	EAR
Schuppen,	JK	top	bulb	DER
Zu Zeiten ansteckender Krankheiten . . . Trage man Knoblauch bei sich; er wird sie neutralisieren	JK	top	bulb	APO
ziehen das Gift aus den Wunden, das durch Schlangen- oder Hundebiss entstanden	JK	top	bulb	ANT
Ausleiten und Regeneration	UB	syst	bulb	HUM
Bluthochdruck / Arteriosklerose / arterielle Durchblutungsstörung	UB	syst	bulb	CAR
gegen Grippeviren	UB	syst	bulb	RES
Scientific herbals				
prophylaxis of arteriosclerosis	ESCOP	syst	bulb	SKE
treatment of elevated blood lipid levels	ESCOP	syst	bulb	CAR
upper respiratory tract infection	ESCOP	syst	bulb	RES
***Matricaria chamomilla* L.** [2)]				
Antiquity				
gegen Blähungen und Darmverschlingung getrunken, vertreiben die Gelbsucht und heilen Leberleiden	DIOS	syst	planta tota	GAS
im Trank und Sitzbade befördern sie die Menstruation, treiben den Embryo aus	DIOS	syst	planta tota	GYN
sowie den Stein und den Urin; Abkochung gegen Blasenentzündung	DIOS	syst	planta tota	URO
heilen sie Soor	DIOS	top	planta tota	DER
helfen sie auch bei Geissauge	DIOS	top	planta tota	DER
im Trank und Sitzbade befördern sie die Menstruation, treiben den Embryo aus	DIOS	top	planta tota	GYN
sowie den Stein und den Urin	DIOS	top	planta tota	URO
um das periodische Fieber zu vertreiben	DIOS	top	planta tota	FEV

Species Time period	Herbal [1]	Appli-cation [2]	Plant part	Use Category [3]
Monastic period				
und wenn die Frauen den Monatsfluss haben, sollen sie dies Suppe, wie vorhin gesagt, bereiten und essen, und dies bereitet eine angenehme und leichte Reinigung . . .	HvB	syst	herba	GYN
wer in den Eingeweiden Schmerzen hat	HvB	syst	herba	GAS
beruhigt das Grimmen und eine Aufblähung des Magens, hilft Gelbsüchtigen, bei Beschwerden des Magens	MF	syst	herba	GAS
reinigt sie durch den Harnfluss die Milz	MF	syst	herba	VAR
so hindert si durch diesen Trunk verderbenbringende Schlangenbisse	MF	syst	herba	ANT
sorgt für ordentlichen Monatsfluss, mit Wein getrunken die Leibesfrucht abtreiben	MF	syst	herba	GYN
treibt Harn, zerbricht die Blasensteine	MF	syst	herba	URO
Augenschwellungen sowie eiter fressende Schwären	MF	top	herba	EYE
Fieberkranken wärmend salbst, wirst du Schüttelfrost und oftmals Fieber selbst vertreiben	MF	top	herba	FEV
geschwollener Weichbauch behandeln	MF	top	herba	VAR
Hautentzündungen; tilgt es Schuppen und Leberflecken im Gesicht	MF	top	herba	DER
Renaissance				
bringen den frawen ir zeyt	LF	syst	planta tota	GYN
denen so von nattern gebissen sind	LF	syst	planta tota	ANT
treiben den harn und den stein	LF	syst	planta tota	URO
vertreiben den blaest und wind und auch den schmerz der kleinen daerm, reinigt die geelsüchtigen und ist nützlich den lebersüchtigen	LF	syst	planta tota	GAS
bringen den frawen ir zeyt	LF	top	planta tota	GYN
clystier im fieber gebraucht	LF	top	planta tota	FEV
fisteln der augen	LF	top	planta tota	EYE
heylet alte wunden und schaeden	LF	top	planta tota	DER
lindert auch allerley schmerzen und nimpt hinweg die muede der glieder	LF	top	planta tota	SKE
treiben den harn und den stein, lindern den schmerzen der blase	LF	top	planta tota	URO
vetreiben die mundfeule	LF	top	planta tota	DER
Popular herbals				
Blasenentzündung	BVA	syst	flower	URO
Entzündung in Mund- und Rachenhöhle, Linderung nach Zahnoperationen	BVA	syst	flower	DER
innere Unruhe	BVA	syst	flower	NER
Magenkrämpfe, Magenschleimhautkatarrh, Koliken im Magen- Darm-Trakt, krampfartige Unterleibsschmerzen, Blähungen, Durchfall, Brechreiz	BVA	syst	flower	GAS
Schnupfen, Neben- und Stirnhöhlenkatarrh	BVA	top	flower	RES
Blähungen, Druck	JK	syst	flower	GAS
Enge auf der Brust	JK	syst	flower	RES
Gelbsucht	JK	syst	flower	GAS
inneren Krämpfen (der Frauen)	JK	syst	flower	GYN
Steinleiden	JK	syst	flower	URO
Augenleiden	JK	top	flower	EYE
Blähungen, Druck	JK	top	flower	GAS
Geschwulsten, Beulen	JK	top	flower	DER

Species Time period	Herbal [1)]	Appli-cation [2)]	Plant part	Use Category [3)]
inneren Krämpfen (der Frauen)	JK	top	flower	GYN
Kopfschmerzen	JK	top	flower	NER
Ohrenleiden	JK	top	flower	EAR
Quetschungen, Rheumatismus, Gicht	JK	top	flower	SKE
Zahnoperation	JK	top	flower	TEE
Erkältungen	KN	syst	flower	RES
Grimmen (heftigem Leibweh), Krämpfen, starken Kongestionen; wunder und geschwüriger Magen	KN	syst	flower	GAS
Krämpfe zu Beginn der Periode	KN	syst	flower	GYN
schweisstreibendes Mittel	KN	syst	flower	FEV
Wirkung auf Harnsystem	KN	syst	flower	URO
Spülflüssigkeit (Entzündungen der Mund- und Halsschleimhäute, Angina . .Zahnfleischeiterungen)	KN	n.d.	flower	DER
Spülflüssigkeit (Lidrand)	KN	n.d.	flower	EYE
Spülflüssigkeit (Unterleibs- und Blasenkatarrh)	KN	n.d.	flower	URO
Blähungen, Durchfall, Magenleiden, - Verschleimungen	MT	syst	flower	GAS
Menstruationsstörungen	MT	syst	flower	GYN
Nebenhodenentzündungen	MT	syst	flower	VAR
Schlaflosigkeit	MT	syst	flower	NER
Bindehautentzündung	MT	top	flower	EYE
Wundschmerzen	MT	top	flower	DER
Zahnschmerzen	MT	top	flower	TEE
Schnupfen, Nebenhöhlenkatarrh	MT	vol	flower	RES
akute Magenerkrankungen/ Sodbrennen, Gastritis, Magen- und Zwölffingerdarmgeschwür	UB	syst	flower	GAS
Wundbehandlung	UB	top	flower	DER
Scientific herbals				
Traditional herbal medicinal product (indication 1) used for the symptomatic treatment of minor gastro-intestinal complaints such as bloating and minor spasms	EMA	syst	flower	GAS
Traditional herbal medicinal product used for adjuvant therapy of irritations of skin and mucosae in the anal and genital region, after serious conditions have been excluded by a medical doctor.	EMA	top	essent. oil	DER
Traditional herbal medicinal product (indication 3) for the treatment of minor ulcers and inflammations of the mouth and throat.	EMA	top	flower	DER
Traditional herbal medicinal product (indication 4) used for adjuvant therapy of irritations of skin and mucosae in the anal and genital region, after serious conditions have been excluded by a medical doctor.	EMA	top	flower	DER
Traditional herbal medicinal product (indication 5) used for the treatment of minor inflammation of the skin (sunburn) and superficial wounds and small boils (furuncles).	EMA	top	flower	DER
Traditional herbal medicinal product (indication 2) used for the relief of symptoms of common cold.	EMA	vol	flower	RES
symptomatic treatment of gastrointestinal complaints such as minor spasms, epigastric distension, flatulence and belching	ESCOP	syst	flower	GAS

Species Time period	Herbal [1]	Application [2]	Plant part	Use Category [3]
minor inflammations of skin and mucosa, including the oral cavity and the gums, and the anal and genital area	ESCOP	top	flower	DER
respiratory tract	ESCOP	top	flower	RES
Magen-Darmbeschwerden	WI	syst	flower	GAS
Menstruationsbeschwerden	WI	syst	flower	GYN
Haut- und Schleimhautentzündungen	WI	top	flower	DER
Entzündungen und Katarrhen im Nasen-Rachenraum	WI	vol	flower	RES
***Ruta graveolens* L.**				
Antiquity				
beruhigt es Leibschneiden, dann auch wirkt es gegen Seiten-	DIOS	syst	leaves	GAS
Brustschmerz, Atemnot, Husten, Brustfellentzündung	DIOS	syst	leaves	RES
Den Geruch und die Schärfe von Lauch und Zwiebeln mildert	DIOS	syst	leaves	GAS
der den Harn nicht halten kann, und ihm wird geholfen	DIOS	syst	seeds	URO
ein Gegenmittel gegen Gifte	DIOS	syst	seeds	ANT
ferner gegen Aufblähen [des Magens], der Gebärmutter [und des Rektums mit Öl gekocht] als Injektion	DIOS	syst	leaves	GYN
gegen periodische Frostschauer	DIOS	syst	leaves	FEV
gegessen sowohl wie getrunken stellen sie den Durchfall	DIOS	syst	leaves	GAS
Ischias- und Gelenkschmerzen	DIOS	syst	leaves	SKE
machen tödlichen Gifte unwirksam, In derselben Weise genommen sind sie ein gutes Mittel gegen Schlangenbisse	DIOS	syst	leaves	GAS
mit Feigen gegen das unter dem Fleische gebildete Wasser	DIOS	syst	leaves	URO
Schärfe des Gesichts	DIOS	syst	leaves	EYE
vernichtet das Peganon die Leibesfrucht	DIOS	syst	leaves	GYN
wirft es den Bandwurm hinaus	DIOS	syst	leaves	GAS
als Pulver eingeführt stillt es Nasenbluten	DIOS	top	leaves	DER
aufgestrichen bessert es Flechten	DIOS	top	leaves	DER
denselben Mitteln entfernt es im Umschlag Feigwarzen und gewöhnliche Warzen	DIOS	top	leaves	DER
ferner gegen Aufblähen des Magens, [der Gebärmutter] und des Rektums mit Öl gekocht als Injektion	DIOS	top	leaves	GAS
Gebärmutterkrämpfe	DIOS	top	leaves	GYN
Gelenkschmerzen	DIOS	top	leaves	SKE
Hautausschlag mit Myrtenwachssalbe	DIOS	top	leaves	DER
heilt er roseartige Entzündungen, kriechende Geschwüre und bösen Grind	DIOS	top	leaves	DER
heilt es die weiße Ventiligo, und mit denselben Mitteln entfernt es im Umschlag Feigwarzen und gewöhnliche Warzen	DIOS	top	leaves	DER
Hodenentzündungen	DIOS	top	leaves	DER
mit Feigen gegen das unter dem Fleische gebildete Wasser	DIOS	top	leaves	URO
mit Graupen im Kataplasma lindert es heftige Augenschmerzen	DIOS	top	leaves	EYE
Mittel bei Ohrenschmerzen	DIOS	top	leaves	EAR
Rosensalbe und Essig hilft es bei Kopfschmerzen,	DIOS	top	leaves	NER
Stumpfsichtigkeit	DIOS	top	leaves	EYE
Monastic period				

Species Time period	Herbal [1]	Appli-cation [2]	Plant part	Use Category [3]
auch wenn jemand eine andere Speise gegessen hat, wovon es ihn schmerzt	HvB	syst	leaves	GAS
auch ein Mensch, der triefende Augen hat,	HvB	top	leaves	EYE
Antoniusfeuer,	MF	syst	-	VAR
beschleunigt die Kindsgeburt, sorgt für geordneten Monatsfluss	MF	syst	-	GYN
beseitigt sie Geschwülste in der Gebärmutter	MF	syst	-	GYN
erfreut Lunge und Brust und heilt das Rippenleiden	MF	syst	-	RES
Gichtkrampf und Hüftgicht	MF	syst	-	SKE
Grimmdarm, nützt sämtlichen Darmkrankheiten	MF	syst	-	GAS
heilt das Fieber, wenn du sie grün in Öl abkochst	MF	syst	-	FEV
heilt Schmerzen Nieren	MF	syst	-	URO
heilt Schmerzen von Brust	MF	syst	-	RES
heilt Schmerzen von Flanken, Leber, wirkt verdünnend auf die Galle, erweichend auf den harten Leib, stärkt Magen	MF	syst	-	GAS
hilft sie der Gebärmutter und einer Eingeweidegeschwulst	MF	syst	-	GYN
Kopfschmerzen	MF	syst	-	NER
macht sie trübe Augen hellsichtig	MF	syst	-	EYE
nutzbringend dem Magen	MF	syst	-	GAS
räudige Krätze, Kopfgrundflechte, in der Nase entstehende Borken	MF	syst	-	DER
stillt Bauchgrimmen	MF	syst	-	GAS
stillt das ausströmende Blut (Nase) sehr gut	MF	syst	-	DER
stillt Husten	MF	syst	-	RES
treibt sie die Spulwürmer hinaus	MF	syst	-	GAS
Wassersüchtigen	MF	syst	-	URO
widersteht man den Giften (Mithridates)	MF	syst	-	ANT
zähmt Liebesgier	MF	syst	-	APH
geschwollene Hoden	MF	top	-	URO
vertreibst du Ohrenschmerzen durch Einträufeln	MF	top	-	EAR
Renaissance				
treibt den harn du bring den frawen ihre krankheyt	LF	-	-	URO
fuert aus allerely würm	LF	syst	leaves	GAS
gut für allerley toedtlich gifft	LF	syst	seeds	ANT
gut wider die schaedlichen pfifferling	LF	syst	leaves	ANT
miltert das grimmen	LF	syst	leaves	GAS
nützlich denen so von den scorpion, spinnen, bynen, wesüen, hurneuss unnd wuetenden hunden gestochen oder gebissen seind	LF	syst	leaves	ANT
reyniget er die frawen nach der geburt und treibt aus das bürdlin und die todten frucht	LF	syst	leaves	GYN
scheffen das gesicht	LF	syst	leaves	EYE
schwerlich athmen und husten zu den geschwaeren der lungen	LF	syst	leaves	RES
stellen den bauchfluss	LF	syst	leaves	GAS
tilget aus den menschlichen Samen	LF	syst	leaves	APH
vertreibt es die geschwulst der Wassersucht	LF	syst	leaves	CAR
weetagen der hüfft	LF	syst	leaves	SKE
weetagen der seiten, brust und dergleichen	LF	syst	leaves	VAR
widerstreben allerley gifft und dem pestilentzischen boesen lufft, wider die	LF	syst	leaves	ANT

Species Time period	Herbal [1)]	Appli-cation [2)]	Plant part	Use Category [3)]
schlangen und natern				
allerley flechten und zittermaeler am leib	LF	top	leaves	DER
das rotlauff und den fliessenden grind des hauptes	LF	top	leaves	DER
grimmen und weetagen der daerm	LF	top	leaves	GAS
heylen allerley rauden grund und kropff	LF	top	leaves	DER
heylen sie allerley maeler derselbigen [haut]	LF	top	leaves	DER
heylet die zerbrochnen glider	LF	top	leaves	SKE
legen sie den weetagen der augen, macht ein klar und lauter gesicht	LF	top	leaves	EYE
macht er klare augen	LF	top	leaves	EYE
miltert es die schmerzen der gleychen [würm]	LF	top	leaves	GAS
nützlich denen so von den scorpion, spinnen, bynen, wesüen, hurneuss unnd wuetenden hunden gestochen oder gebissen seind	LF	top	leaves	ANT
so einer nit harnen mag	LF	top	leaves	URO
so erwermen sie der erfrorenen glider	LF	top	leaves	DER
stellen das bluten der nasen	LF	top	leaves	DER
verhuetet das auffsteigender muter	LF	top	leaves	GYN
vertreibt es die geschwulst der Wassersucht	LF	top	leaves	CAR
verzert das undergerunnen blut und allerley masen am leib	LF	top	subt. parts	DER
weetagen der ohren, bring das gehoer widerumb unnd vertreibet das sausen und klingen derselbigen	LF	top	leaves	EAR
weetagen des haupts	LF	top	leaves	NER
zerteylen sie die geschwulst [der gemecht] und lindern den schmerzen derselben	LF	top	leaves	DER
so mit dem tieffen schlaaf beladen seind fürgehalten, das sie daran reiechen mact dieselbigen widerum munder und wacker	LF	vol	leaves	NER
Popular herbals				
alle Arten von Würmern	JK	syst	leaves	GAS
Bisse von Schlangen, wütenden Hunden, Insektenstichen	JK	syst	leaves	ANT
Fallsucht	JK	syst	leaves	NER
Schwindel, Herzbeklemmung	JK	syst	leaves	CAR
Bisse von Schlangen, wütenden Hunden, Insektenstichen	JK	top	leaves	ANT
erhält uns stärkt die Sehkraft	JK	top	leaves	EYE
Ohrensausen, das nicht von Herzschwäche herrührt; Ohrenkanäle, die verschwollen sind	JK	top	leaves	EAR
Warzen	JK	top	herba, juice	DER
Fliegen, Wanzen, usw. Kleidermotten	JK	vol	planta tota	VAR
Schwerhörigkeit	JK	vol	leaves	EAR
Atmungsbeschwerden	KN	syst	leaves	RES
Kongestion, das ist Blutandrang zum Kopfe, bei Eingenommenheit des Kopfes, Schwindel	KN	syst	leaves	CAR
Unterleibsbeschwerden und -zuständen	KN	syst	leaves	GYN
Verdauungsstörungen, Blähsucht und Koliken	KN	syst	leaves	GAS
venöse Gefässerkrankungen	UB	syst	leaves	CAR

***Sambucus* spp.**				
Antiquity				
Sambucus nigra				
Auch die Frucht, mit Wein getrunken, hat dieselbe Wirkung	DIOS	syst	fruits	ANT
Die Blätter, wie Gemüse gekocht, fahren Schleim und Galle ab	DIOS	syst	leaves, twigs	HUM
hilft sie auch bei Schlangenbiss	DIOS	syst	leaves	ANT
ist für Wassersüchtige zuträglich	DIOS	syst	leaves	URP
eingerieben färbt sie die Haare schwarz	DIOS	top	fruits	VAR
erweicht und öffnet sie die Gebärmutter und bringt Affectionen derselben in Ordnung	DIOS	top	subt. parts	GYN
helfen bei Podagra	DIOS	top	leaves	SKE
hindern Entzündungen, ebenso sind sie als Kataplasma ein gutes Mittel bei Verbrennungen und Hundsbiss; Sie verbinden auch fistelartige Geschwüre	DIOS	top	leaves	DER
Monastic period				
Sambucus ebulus				
Aber wenn einem Menschen von üblen Säften der Kopf wie ein Sturzbach tost	HvB	top	leaves	NER
Und wenn ein Mensch an den Fingern und an den Füssen den Grind hat	HvB	top	leaves	DER
Sambucus nigra				
Gelbsucht	HVB	syst	leaves	GAS
Gelbsucht	HvB	top	leaves	GAS
Gelbsucht	HvB	vol	leaves	GAS
Renaissance				
Sambucus nigra				
miltern die übrige hitz	LF	-	leaves	VAR
vertreiben und toedten die floee und mucken	LF	-	leaves	VAR
erweycht sie und eroeffnet die hertten und verschwollne muter	LF	syst	fruits	GYN
ist den wassersüchtigen seer gut, dan sie treibt gewaltig das wasser aus dem leib	LF	syst	subt. parts	CAR
nützlich, denen von natern gebissen seind	LF	syst	subt. parts	ANT
treiben aus den rotz pituitam genent und die gallen	LF	syst	herba	HUM
erweycht sie und eroeffnet die hertten und verschwollne muter	LF	top	subt. parts	GYN
gut zu dem brand un denen so von einem wuetenden hund gebissen seind, sie heylen auch die tieffen und holen wunden	LF	top	leaves	DER
lindern den schmerzen des podagrams	LF	top	leaves	SKE
macht das har schwarz	LF	top	fruits	VAR
Popular hebals				
Sambucus ebulus				
Ischias, Rheumatismus, Gicht	JK	syst	subt. parts	SKE
stark wassertreibend; beginnende Wassersucht	JK	syst	subt. parts	URO
Auch bei anderen Zufällen im Unterleib, die von schlechten Säften herrühren, wirkt er gut; er scheidet die Säfte durch den Urin aus	KN	syst	subt. parts	URO
treibt mit ausserordentlicher Wirkung bei Wassersucht das Wasser ab und reinigt die Nieren	KN	syst	subt. parts	URO
Sambucus nigra				
Blut-, Darmreinigung	BVA	syst	fruits	HUM

Erkältung, Katarrh, Schnupfen, Lungenentzündung	BVA	syst	flowers	RES
Fieber, Grippe	BVA	syst	flowers	FEV
gegen üblen Körpergeruch, Hautunreinheiten	BVA	syst	flowers	DER
Infektionskrankheiten,	BVA	syst	flowers	FEV
Neuralgien, Trigeminusneuralgie, Ischias Nervenentzündung	BVA	syst	fruits	NER
Rheuma, Gicht	BVA	syst	flowers	SKE
schweisstreibendes Mittel	BVA	syst	flowers	FEV
Stärkung der körpereigenen Abwehrkräfte	BVA	syst	flowers	TON
Durchfall	JK	syst	fruits	GAS
Frühlingskur Säfte und Blut reinigen	JK	syst	leaves	URO
Grippe und Erkältung	JK	syst	flowers	RES
räumt mit schlechten Magensäften gründlich auf	JK	syst	bark	GAS
reinigen das Blut und treiben zähe und verstockte Stoffe aus	JK	syst	fruits	URO
Rheumatiker	JK	syst	flowers	SKE
Wassersüchtige und Korpulente, die wieder schlank werden möchten	JK	syst	subt. parts	URO
Brand in den Augen	JK	top	leaves	EYE
Wurm am Finger, Hundebiss	JK	top	leaves	DER
ziehen den Brand aus	JK	top	flowers	FEV
bei allen mit Fieber einhergehenden Krankheiten . . .	KN	syst	flowers	GAS
Blutreinigungskur; wirkt auf die Urinausscheidung und günstig auf die Nieren	KN	syst	fruits	URO
einfachste Blutreinigungstee (harntreibende Wirkung!)	KN	syst	leaves	URO
Erkrankungen der Luftwege, Schnupfen, Rachen- und Kehlkopf-, Luftröhrenentzündung . . .	KN	syst	flowers	RES
heftiges Abweichen, reinigen den Magen	KN	syst	fruits	GAS
Wassersucht Einzug halten . . . treibt die Holunderwurzel so kräftig Wasser aus . . .	KN	syst	subt. parts	VAR
Gürtelrose	UB	syst	fruits	DER
schweisstreibendes Mittel bei Erkältungskrankheiten	UB	syst	flowers	RES
schweisstreibendes Mittel bei Erkältungskrankheiten	UB	top	flowers	RES
Volksmedizin: Ischias und Neuralgien	WI	syst	fruits	NER
Volksmedizin: Gurgelmittel	Wi	top	flowers	RES
Scientific herbals				
Herbal medicinal product traditionally used for the relief of early symptoms of common cold.	EMA	syst	flowers	RES
Diaphoretikum bei Erkältungskrankheiten	WI	syst	fruits	RES
Diuretikum	WI	syst	fruits	URO
fiebrige Erkältungskrankheiten	WI	syst	flowers	RES
Laxans	WI	syst	fruits	GAS

***Valeriana officinalis* agg.**				
Antiquity				
befördert die Katamenien	DIOS	syst	subt. parts	GYN
leistet dasselbe [und den Urin zu treiben]	DIOS	syst	subt. parts	URO
und den Urin zu treiben	DIOS	syst	subt. parts	URO
und wirkt gegen Seitenschmerz	DIOS	syst	subt. parts	VAR
wird den Gegengiften zugemischt	DIOS	syst	subt. parts	ANT
Monastic period				
Brustfellentzündung, von der Gicht Schmerzen	HvB	syst	-	SKE
Renaissance				
ist auch trefflich gut den wunden und schaeden dan sie heylet dieselbigen	LF	-	subt. parts	DER
bringt den frawen ihre zeit	LF	syst	subt. parts	GYN
stillt den weetagen der seiten	LF	syst	subt. parts	VAR
treibt den Harn	LF	syst	subt. parts	URO
under die artzneyen vermischt so manfür gifft braucht, darumb ist sie zu der zeit der Pestilenz ser gut davon getruncken	LF	syst	subt. parts	ANT
macht ein klar gesicht	LF	top	subt. parts	EYE
Popular herbals				
Abgewöhnung von Alkohol, Nikotin	BVA	syst	subt. parts	VAR
Krampfzustände im Magen-, Darmbereich, krampfartiges Erbrechen,	BVA	syst	subt. parts	GAS
Schilddrüsenüberfunktion	BVA	syst	subt. parts	VAR
Schlaflosigkeit, Nervosität, nervöse Herzstörungen, Herzklopfen, nervöse Kopfschmerzen, Migräne, Angst, Erregungszustände, nervöse Kinder	BVA	syst	subt. parts	NER
Wechseljahrbeschwerden, krampfartige Menstruation,	BVA	syst	subt. parts	GYN
bei allen nervösen Leiden	JK	syst	subt. parts	NER
Herzschwäche	JK	syst	subt. parts	CAR
reinigt Leber, Milz und Galle	JK	syst	subt. parts	GAS
schwachen Augen	JK	syst	subt. parts	EYE
treibt den Urin; führt sogar den Stein aus	JK	syst	subt. parts	URO
Verschleimung und Atembeschwerden	JK	syst	subt. parts	RES
Blasensteinen	JK	top	planta tota	URO
Gicht	JK	top	planta tota	SKE
vertreibt Kopfschmerzen	JK	top	planta tota	NER
Baldriantee beeinflusst das Nervensystem; Verwendung als Schlafmittel	KN	syst	subt. parts	NER
lindert Kopfbeschwerden und behebt krampfhafte Zustände . . . Weils sie deren hauptsächlichste Ursache, die Gase nämlich ausscheidet	KN	syst	subt. parts	NER
werden Zustände von Herzunruhe mit Herzklopfen	KN	syst	subt. parts	CAR
Nervöse Erregungs- und Unruhezustände	UB	syst	subt. parts	NER
Nervöse Erregungs- und Unruhezustände	UB	syst	subt. parts	NER
Nervöse Erregungs- und Unruhezustände	UB	top	subt. parts	NER
Scientific herbals				
mental relaxation and normal sleep	EMA	syst	subt. parts	NER
relief of temporary mild nervous tension and / or difficulty in falling asleep	ESCOP	syst	subt. parts	NER
sedierende Wirkung	WI	syst	subt. parts	NER

[1] BVA=Bruno Vonarburg (Vonarburg, 1988), DIOS=Dioscorides (Berendes, 1902), EMA=EMA, ???, ESCOP=Escop???, HvB=Hildegard von Bingen (Portmann, 1991), JK=Johann Künzle (Künzle, 1945), KN=Sebastian Kneipp (Kneipp, 2010), LF=Leonhart Fuchs (Dobat and Dressendörfer, 2001), MF=Macer floridus (Mayer and Goehl, 2001), MT=Maria Treben (Treben, 2011), UB=Ursel Bühring (Bühring, 2005), VAL=Jean Valnet (Valnet, 1992), WI=Wichtl (Wichtl, 2008). For details see main text Table 1 and Dal Cero et al. 2014.

[2] syst=systemic application (oral, suppository), top=topic application, vol=volatile application (steam, smoke)

[3] ANT=Antidot, APH=Aphrodisiac, APO=Apotropaic, CAR=Cardiovascular, DER=Dermatological, EAR=Ear, EYE=Ophthalmic, FEV=Fever, GAS=Gastrointestinal, GYN=Gynaecological, HUM=Humoral, NER=Nerves, RES=Respiratory, SKE=Muscoskeletal, TEE=Teeth, TON=Tonic, URO=Urological, VAR=Varia

[4] *Matricaria chamomilla* L. has to be understood as ethnotaxon in Antiquity and monastic medicine, i.e. genus *Anthemis* could also be included

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Personal Data

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Date and place of birth: 24 June, Zurich (Switzerland)

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Education

2010 – present	Dissertation studies in ethnobotany at the Institute of Systematic Botany University of Zurich, Switzerland. Advisors: Prof. Dr. P. Linder, Prof. Dr. R. Saller, Supervisor: Dr. C. S. Weckerle
2008	CAS in Ethnobotany and Ethnomedicine, University of Zurich
1994	Diploma in environmental sciences (dipl. Natw. ETH), ETH Zurich. Diploma thesis: "Bedeutung der Ökomorphologie für die Zusammensetzung der Fischfauna in der Suhre unter spezieller Berücksichtigung des Schneiders *Alburnoides bipunctatus* (Bloch) ".
1989 – 1994	Basic and Diploma studies in environmental sciences at the Swiss Federal Institute of Technology (ETHZ), focus on terrestrial / aquatic ecology and environmental education.
1984 – 1988	Kantonsschule St. Gallen, Matura type B.

Employment, research and professional experience

1/2010 – present	PhD Student, Institute of Systematic Botany, University of Zurich. Research topic: medicinal flora and herbalists of Switzerland.
8/2012 – 12/2012 11/2010 – 2/2011	Replacing Dr. C. Weckerle, Institute of Systematic Botany, University of Zurich, during her maternity leave
since 2004	professional freelance activities as lecturer (Botany and Phytotherapy), consultant (i.e. Medicinal Herb Gardens) and book author (e.g., Unsere Heilpflanzen, Ott Bern 2009).
1996 – 2003	CEO Umwelt-Fachstelle für Bau + Energie + Landschaft at Schaffhausen (Switzerland); private company in environmental sciences.
1996 – 1998	Group leader and lecturer in environmental education at VEDC PPPGT / VEDC Malang (Indonesia)(Swisscontact, DEZA); Center for vocational education and training.

Publication List 2014-2015

Peer-reviewed articles

Dal Cero M, Saller R, Leonti, M, Weckerle CS: How did medicinal plant use change over time? A diachronic study over two millennia in Switzerland. (mansucript ready to submit), 2015.

Dal Cero M, Saller R, Weckerle CS: Herbalists of Today's Switzerland and Their Plant Knowledge. A Preliminary Analysis from an Ethnobotanical Perspective. Forsch. Komplementmed. 2015, 22:238–245.

Dal Cero M, Saller R, Weckerle CS: The use of the local flora in Switzerland: A comparison of past and recent medicinal plant knowledge. J Ethnopharmacol, 2014;151:253-264.

Scientific Congresses

Dal Cero M, 2013: Was kann die Volksmedizin zum therapeutischen Wissen beitragen? Jahrestagung der Schweizerischen Gesellschaft für Phytotherapie (SMGP), November 21, 2013, Baden (oral presentation)

Dal Cero M, 2013: Heilpflanzen-Traditionen in der medizinischen Landschaft der Schweiz. Phytokongress 2013, March 8 – 10, Leipzig (oral presentation)

Dal Cero M, Saller R, Weckerle CS, 2012: Folk medicinal practices in Switzerland and the use of the Swiss flora: a comparison of past and present knowledge. 13th International Congress of the Society for Ethnopharmacology, September 2 – 6, 2012, Graz (poster presentation)

Dal Cero M, 2012: Von Kräuterkunde und Phytotherapie – Einblick in die Tradition der Arzneipflanzenanwendung. Fachsymposium Gesundheit, January 19 – 20, 2012, St. Gallen (oral presentation)

Dal Cero M, 2008: Hausmittel für die Leber, Ethnobotanisch-ethnomedizinische Reflexionen, Leberpflanzen und ihre Anwendung. Jahrestagung der Schweizerischen Gesellschaft für Phytotherapie (SMGP), November 20, 2008, Baden (oral presentation)

Teaching Experience

since 2010 Teaching Assistant for lectures and practical course in Ethnobotany andbasic course Botany, University of Zurich (lecturer C. Weckerle)

2012 - 2015 Didaktisches Qualitfizierungsprogramm ‚Teaching skill', Hoschuldidaktik, Universtität Zürich

since 2010 Pharmaco Botanical Excursions for Swiss Medical Society of Phytotherapy (SMGP)

Public outreach

Presentations

Dal Cero M, 2015: Botanische Einblicke – ätherische Öle als Kommunikationsmittel der Pflanzen. Farfalla Jubiläumskongress, June, 6-7, 2015, Zürich (oral presentation)

Dal Cero M, 2013: Chrut und Uchrut: Heilpflanzentraditionen in der Schweiz. 1. Europäischer Kongress für Naturheilkunde, Alternativ- und Komplementärmedizin, September 7-8, 2013, Winterthur (oral presentation)

Dal Cero M, 2013: Heilpflanzen – was man früher noch darüber wusste. Museumsvortrag Naturmuseum Winterthur, March, 2, 2013 (oral presentation)

Dal Cero M, 2012: Kräuterkunde in der Schweiz – wohin?. Institut for Systematic Botany, University Zurich, August 31, 2012 (Workshop presentation)

Publications
Articles:

Dal Cero M, 2015: Der klösterliche Heilpflanzengarten. In Bannhof und Heilpflanzengarten St. Georgen. Hrsg. Bundesamt für Kultur, BAK, Bern. 20 pp.

Dal Cero M, 2014: Was kann die Volksmedizin zum therapeutischen Wissen beitragen? Ars Medici Thema Phytotherapie 1/2014.

Dal Cero M, 2012: Heilpflanzen in der medizinischen Landschaft der Schweiz. Schweizerische Zeitschrift für Ganzheitsmedizin. 2012;24:293–296

Dal Cero M, 2011: Pflanzen für die Schön- und die Schlechtfärberei. Topiaria Helvetica, 2011: 50-58.

Dal Cero M, 2009: Buchweizen – Grano Saraceno. Schweizer Staudengärten, Nummer 38, 2009, ISSN 1011-5838

Dal Cero M, 2009: Arzneipflanzen unter den Knöterichgewächsen. Schweizer Staudengärten, Nummer 38, 2009, ISSN 1011-5838

Dal Cero M, 2009: Hausmittel für die Leber, Ethnobotanisch-ethnomedizinische Reflexionen, Leberpflanzen und ihre Anwendung. Ars Medici Thema Phytotherapie, 1/2009, ISSN 004-2897

Books:

Dal Cero M, 2010: Arzneipflanzen bei Atemwegserkrankungen – Medizin aus der Natur. Lunge Zürich Hrsg., 67pp.

Dal Cero M, 2009: Unsere Heilpflanzen. ott Verlag Bern, 384pp.

Dal Cero M, 2004: Pflanzen für die Gesundheit - Botanik in der Praxis. hep Verlag Bern, 250pp.

Kunz M, Dal Cero M et al., 2006: Kompetenzen für die Zukunft. Nachhaltige Entwicklung konkret. Hrsg. Regula Kyburz-Graber Universität Zürich. hep Verlag Bern, 200pp.

Book Reviews:

Dal Cero M 2015: Praxis–Lehrbuch Heilpflanzenkunde – Grundlage, Anwendung, Therapie. Bühring U., 4. Ed., 2015. Haug, Stuttgart. In: Schweizerische Zeitschrift für Ganzheitsmedizin, 5/2015.

Dal Cero M, 2013: Lernkarten Heilpflanzenkunde. Bühring U, Ell-Beiser H, Girsch M, 2013. Haug, Stuttgart. In: Schweizerische Zeitschrift für Ganzheitsmedizin, 2013.

Journal Reviewer

Schweizerische Zeitschrift für Ganzheitsmedizin

Professional Affiliations

Swiss Medical Society of Phytotherapy (from 2016 board member)

International Society of Ethnopharmacology

Netzwerk Ethnobiologie Schweiz